REPORT RESUMES

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REPORT OF THE INTERNATIONAL CLEARINGHOUSE ON SCIENCE AND MATHEMATICS CURRICULAR DEVELOPMENTS 1966.

BY- LOCKARD, J. DAVID

MARYLAND UNIV., COLLEGE PARK

AMERICAN ASSN. FOR THE ADVANCEMENT OF SCIENCE

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INFORMATION CONCERNING CURRENT PROJECTS TO DEVELOP SCIENCE AND MATHEMATICS CURRICULAR MATERIALS IS PRESENTED. PROJECTS FROM THE UNITED STATES AND MORE THAN 25 OTHER COUNTRIES ARE INCLUDED. EACH PROJECT IS LISTED SEPARATELY. INFORMATION FOR EACH PROJECT INCLUDES--(1) TITLE, (2) PRINCIPAL ORIGINATORS, (3) PROJECT DIRECTOR, (4) ADDRESS OF THE PROJECT HEADQUARTERS, (5) PROFESSIONAL STAFF, (6) PROJECT SUPPORT,. (7) PURPOSES AND OBJECTIVES, (8) SPECIFIC SUBJECT AND GRADE LEVEL, (9) MATERIALS THAT HAVE BEEN PRODUCED, (10) HOW PROJECT MATERIALS ARE BEING USED, (11) LANGUAGE IN WHICH MATERIALS HAVE BEEN WRITTEN, (12) LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATIONS, (13) ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED, (14) MATERIALS AVAILABLE FREE, (15) PURCHASABLE MATERIALS, (16) SPECIFIC PLANS FOR EVALUATION OF MATERIALS, (17) SPECIFIC PLANS FOR TEACHER PREPARATION, AND (18) FUTURE PLANS. COPIES OF THIS 1966 REPORT MAY ALSO BE OBTAINED FROM THE CLEARINGHOUSE ON SCIENCE AND MATHEMATICS CURRICULAR DEVELOPMENTS, SCIENCE TEACHING CENTER, UNIVERSITY OF MARYLAND, COLLEGE PARK, MARYLAND 20740. (AG)

Report of the International Clearinghouse On Science and Mathematics Curricular Developments 1966

ED010761

COMPILED UNDER THE DIRECTION OF J. DAVID LOCKARD

A JOINT PROJECT

of the
Commission on Science Education,
American Association for the Advancement of Science
and the
Science Teaching Center, University of Maryland

SE 000 007

REPORT OF THE
INTERNATIONAL CLEARINGHOUSE
ON
SCIENCE AND MATHEMATICS CURRICULAR DEVELOPMENTS

1966

U. S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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Compiled Under the Direction of
J. David Lockard

A JOINT PROJECT
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American Association for the Advancement of Science
and the
Science Teaching Center, University of Maryland

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INTRODUCTION

This report is the first publication in what is designed as an annual series from the International Clearinghouse on Science and Mathematics Curricular Developments. The International aspects grew from earlier interests of the American Association for the Advancement of Science in the curriculum programs now in progress throughout the world. The Clearinghouse director held discussions with AAAS Commission members in America, with foreign science educators visiting the University of Maryland Science Teaching Center, with Dr. Albert Baez and the UNESCO Science Education staff in Paris, and with staff members of the international division of the National Science Foundation. Based on these discussions, plans were developed to expand the activities of the existing Clearinghouse to include projects from countries throughout the world. The Information Clearinghouse on New Science and Mathematics Curricula, which began operations in 1962 at the University of Maryland, issued three American-oriented annual reports that provided a valuable base of experience for expansion to the international level. Unfortunately, all of those earlier reports are out of print.

It is the intent of the International Clearinghouse to promote better international understanding by helping to establish and maintain cooperative relationships among all the curriculum project participants throughout the world, while at the same time disseminating information on such science and mathematics curricular activities. The very fine cooperation that we have already received from so many project directors in all parts of the world assures a good beginning.

Recognizing that any initial publication such as this is likely to have omissions, we ask all persons reading our report to be constructive in their reactions to the extent that they will submit to us in writing the names and addresses of all directors of ongoing science and mathematics curriculum projects not included in this report. Information on any missing projects or on any incomplete summary we have published will help to make our next report that much more valuable to its users. A cut-off date of June 15, 1966, had to be established for all reports that could be put in this 1966 issue, and all appropriate reports received after that date will be included in the 1967 report.

As in the past, information in the project activities section of the report is taken from the project directors' own response to a questionnaire mailed to them in advance. In all but a very few instances the individual reports were published as actually received. For clarification on individual questions about project reports or for more detailed information, the reader is requested to write directly to the project directors themselves and not to the Clearinghouse. Each individual project report gives information on how to obtain sample materials if available. Our Clearinghouse does not stock such materials for distribution.

The role of the Clearinghouse is to encourage individuals and groups to communicate to each other directly so that even more valuable information can be exchanged. On a following page is a summary of the operation and activities of the University of Maryland's Science Teaching Center which may show its role more specifically. Visitors from all parts of the world are welcome to visit our facilities at any time they are in the Washington, D. C. area, and they are encouraged to use this up-to-date collection of curricular materials within the Center. The International Clearinghouse activities operate on a year-round basis. The director is indebted to the many of his colleagues and acquaintances who contribute to its operation. These individuals include those on the staff of the AAAS, the international and the course content improvement sections of the National Science Foundation, the United States Office of Education, the President's Office of Science and Technology, the U. S. State Department, the Organization for Economic Cooperation and Development, the Pan American Union, and many foreign embassies. The staff at UNESCO furnished important addresses for our international mailings. It is hoped that as this Clearinghouse expands, closer coordination with the UNESCO Science Teaching Center in Paris will enable interested persons on opposite sides of the world to see complete collections of science curriculum project materials.

The year-round operation of our International Clearinghouse would not be possible if it weren't for my dedicated Center colleagues who do much of the work for this publication and personally help the numerous visitors to our Center. My sincere appreciation is given to Harold Gray, Mary Harbeck, Sherry Shearer, Marlene Murray, Donald Poling, Marjorie Gardner, Philip DiLavore and to our Center secretary Louise Wells who did the final typing of this Report. Thanks are also given to our elementary science education specialists Glenn Blough and David Williams for their important roles in the Center's operation. Our Report could not exist without the fine cooperation of the project directors and their staff members, and we again want to thank them for their contributions. Any credit for the value of this Report should go to these people, and any criticisms and constructive suggestions should come to the Clearinghouse Director.

Single copies of this 1966 report will be furnished free to an individual as long as the supply lasts. Such requests should be addressed to Dr. J. David Lockard, Director, International Clearinghouse on Science and Mathematics Curricular Developments, Science Teaching Center, University of Maryland, College Park, Maryland, U. S. A., 20740.

College Park, Maryland
July, 1966

J. David Lockard, Director
International Clearinghouse

The University of Maryland Science Teaching Center

The International Clearinghouse is located in the University of Maryland Science Teaching Center at College Park, Maryland. Designed to serve as a representative facility of its type, the functions of the Science Teaching Center include teacher and supervisor training, graduate education, basic research in science education, and consultative services. In addition to the Clearinghouse activities, the Center staff reviews and displays the latest in science teaching materials for the National Science Teachers Association. The reviews are published each month in the Association's two journals, The Science Teacher and Science and Children.

The Center's facilities include a modern, well-equipped science laboratory, demonstration preparation areas, conference areas, photographic and audio-visual facilities, and an extensive library with relevant periodicals, science textbooks, new curriculum materials and works on science pedagogy and its operational aspects. The International Clearinghouse occupies still another section of the Science Teaching Center. On display here are the latest materials from both national and international science and mathematics curriculum projects. Every attempt is made to keep the collection as comprehensive as possible and it is believed to be one of the most up-to-date collections of such materials in the world.

Each year the Center is host to large numbers of domestic and foreign visitors. Its close proximity to Washington, D. C. and the leading science and educational organizations of the country serves to stimulate such visits while insuring valuable cooperative links for the advancement of science education. Since it is a basic aim of the Clearinghouse to promote international cooperation through the dissemination of information, the Science Teaching Center shall continue to welcome and to aid visitors of all nations in all areas and at all levels of science education.

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I. Projects Listed Alphabetically by Geographical Area or International Organizational Title

I. PROJECT TITLE: African Mathematics Program

II. PRINCIPAL ORIGINATORS: J. R. Zacharias and W. T. Martin

III. PROJECT DIRECTOR: W. T. Martin

IV. PROJECT HEADQUARTERS ADDRESS: Educational Services Incorporated, 55 Chapel St., Newton, Mass. 02158

V. PROFESSIONAL STAFF: W. T. Martin, M.I.T., Chairman African Math Program; C. E. Hardgrove, Northern Illinois Univ., Chairman, Primary Writing Group; Awadagin Williams, Fourah Bay College, Sierra Leone, Chairman, Secondary Writing Group; Christopher Modu, West African Exam Council, Chairman, Testing Group; A. L. Putnam, University of Chicago, D. E. Richmond, Williams College, Chairmen, Teacher Training Group.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: ESI
B. Funding agencies: Agency for International Development; Ford Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: The improvement of the teaching of mathematics in African schools through the introduction of "modern mathematics" taught by heuristic methods.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Mathematics (designed for use in African Schools):
Primary I through VII
Secondary I through V (grades 7 through 12)
Secondary C-I through IV (grades 8 through 12)
Teacher Training Materials
Testing Materials

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION: Entebbe Mathematics Series Materials; Basic Concepts of Math Text; Basic Concepts of Math Errata; Basic Concepts of Math Suppl.; Basic Concepts of Math Vol. 2; Basic Concepts of Math Vol. 3; Basic Concepts of Math Vol. 4; Primary I-III Tchrs.Handbook; Primary One - Pupils; Primary Two, Vol. 1 - Pupils; Primary Two, Vol. 2 - Pupils; Primary Three, Vol. 1 - Pupils; Primary Three, Vol. 2 - Pupils; Primary Four, Pupils; Primary One, Vol. 1 - Teachers; Primary One, Vol. 2 - Teachers; Primary Two, Vol. 1- Teachers; Primary Two, Vol. 2 - Teachers; Primary Three, Vol. 1 - Teachers;

Primary Three, Vol. 2 - Teachers; Primary Four, Teachers; Secondary One - Student; Secondary Two, Vol. 1 - Student; Secondary Two, Vol. 2 - Student; Secondary Two, Vol. 3 - Student; Secondary Three - Algebra Stud.; Secondary Three - Geometry Stud.; Secondary Four - Algebra Stud.; Secondary Four - Geometry Stud.; Secondary C One - Algebra Stud.; Secondary C One - Geometry Stud.; Secondary One, Vol. 1 - Teachers; Secondary One, Vol. 2 - Teachers; Secondary One, Vol. 3 - Teachers; Secondary Two, Vol. 1 - Teachers; Secondary Two, Vol. 2 - Teachers; Secondary Two, Vol. 3 - Teachers; Secondary Three - Algebra Tchrs.; Secondary Three - Geometry Tchrs.; Secondary Four - Algebra Tchrs.; Secondary Four - Geometry Tchrs.; Secondary C One - Algebra Tchrs.; Secondary C One - Geometry Tchrs.

X. USE OF PROJECT MATERIALS: Complete courses not yet available. 800 teachers in the ten African participating countries (Ethiopia; Ghana; Kenya; Liberia; Malawi; Nigeria; Sierra Leone; Tanzania; Uganda, and Zambia) are using our materials. Specific schools where materials are used: Ibadan Grammar School, P. O. Box 21, Ibadan, Nigeria; Morembe School, Box 128, Musoma, Tanzania; Castle Rd. Methodist Duplicated Primary School, P. O. Box 399, Accra, Ghana.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Swahili and Kpelle.

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Primary 4 and 5 will be written in 1966 and 1967; Secondary 4 and 5 will be written in 1966 and 1967; Secondary C-2 and C-3 will be written in 1966 and 1967; Testing materials for Primary 4 through 7 and Secondary 1 through 4.

XIV. MATERIALS AVAILABLE FREE: Inspection sets of the materials are available from ESI to approved requestors. Bulk quantities are not currently available except to the participating African countries.

XV. MATERIALS PURCHASABLE: No materials are currently available on a commercial basis.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Materials are being evaluated by teachers' reports, visits by staff and professional participants, and testing. An experimental testing program has been developing since 1962 and is preparing testing materials for all levels of secondary work. A primary (Grade) Three Test is being developed to measure the depth of understanding of mathematical concepts acquired in the first three years of the primary program. A further evaluation activity being undertaken is an assessment of the sociological and psychological side-effects of the program on African schools and children.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Up to 1965 the main teacher-training efforts were aimed at training teachers who could undertake the necessary experimental work. In 1966, the first year of a two-year program is being initiated at the ABC Institute in Nairobi at which some 45 senior mathematics tutors from senior training colleges, 15 mathematical supervisors from Ministries of Education, and ten African university mathematicians will work with four Institute staffers to prepare themselves to undertake the widespread training of teachers in the ten participating African countries.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: 1965 Workshop: Primary 4 materials; Secondary 4 materials; Secondary C-1 materials; Testing materials for Primary 3 and Secondary 3; Teacher Training materials, Vol. 4; Institutes: Accra, Ghana--August/September 1965 - Primary teachers; Sierra Leone--July/August 1965 - Primary teachers; Zambia--January 1966, Primary teachers; Nigeria (Ibadan)--January 1966, Primary teachers; Tanzania--January 1966, Secondary-C teachers, February 1966, Primary teachers; Liberia--January 1966, Primary teachers.

XIX. PLANS FOR THE FUTURE: 1966 Workshop (Mombasa, Kenya). Continuing the preparation of primary and secondary materials at the next grade levels, and testing materials for Primary 4 and Secondary 4. Nairobi ABC Institute as described above (see XVII). A one-month residential course followed by 10 months correspondence course and a further one-month residential course with an ensuing correspondence course of 10 months. 1967 - Workshop - ABC Institute; 1968 - Workshop - 1971.

I. PROJECT TITLE: West African Examinations Council 'A' Level Chemistry Syllabus

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: West African Examinations Council and Ghana Association of Science Teachers. April, 1964

III. PROJECT DIRECTORS: Robert E. Pearson and J. B. Redhead

IV. PROJECT HEADQUARTERS ADDRESS: Robert E. Pearson, Dept. of Chemistry, Univ. of Ghana, Legon, Ghana, or J. B. Redhead, Dept. of Chemistry, Univ. of Ibadan, Ibadan,Nigeria.

V. PROFESSIONAL STAFF: At the 1964 annual conference of the Ghana Association of Science Teachers, a working party was formed to make proposals to the West African Examinations Council for a new 'A' Level Chemistry Syllabus to replace the London syllabus then in use. These proposals, in the form of a draft syllabus, were submitted to W.A.E.C., which convened national panels in Ghana, Nigeria, Sierra Leone, and Gambia, and finally an international panel representing these four countries to consider the proposals. After slight modifications by these panels, the syllabus was accepted in April 1966 for introduction into schools in Nigeria in December 1966, and in the other countries the following September. Several of the people who have been involved in the various stages of development of the syllabus will share the further concerns of conducting refresher courses and writing teaching materials.

VI. PROJECT SUPPORT:
A. Organizational sponsorships: West African Examination Council (for development of syllabus); National Ministries of Education (Refresher Courses); Ghana Association of Science Teachers; Nigeria Science Teachers Association.
B. Funding agencies: None so far.

VII. SPECIFIC PURPOSES AND OBJECTIVES: To make proposals for a new West African 'A' Level Chemistry Syllabus, and to prepare teaching materials and to run refresher courses for assistance of students and teachers in dealing with the different approach and content of the new syllabus.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Chemistry; 'A' Level (corresponds to London GCE Advanced Level or Cambridge Higher School Certificate).

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Theory and practical syllabuses
2. Specimen examination papers

X. USE OF PROJECT MATERIALS: Syllabus to be introduced in Nigeria in December, 1966; elsewhere in September 1967.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: No others.

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: None have been started.

XIV. MATERIALS AVAILABLE FREE: None

XV. MATERIALS PURCHASABLE: Nos. 1 and 2 above from West African Examinations Council, Accra. Price unknown, since they have not yet been published.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: None

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: A one-week refresher course was held for teachers in Nigeria at the University of Ibadan during the Easter vacation, 1966. A similar course will be held in Ghana, probably at the University College of Cape Coast at Christmas, 1966. In general, the courses consist of lectures on some of the more difficult aspects of the syllabus content, followed by tutorial sessions and questioning of the lecturer. Some laboratory work is included in the program.

XVIII. PROJECT ACTIVITIES SINCE 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: We hope to hold a two-week writing conference at the University of Ibadan at Easter, 1967. Drafts of the materials will have been prepared by that time.

I. PROJECT TITLE: UNESCO Pilot Project for Chemistry Teaching in Asia

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: UNESCO (Albert Baez). Planning Phase, September, 1964; Operational Phase, October, 1965.

III. PROJECT DIRECTOR: Laurence E. Strong, Director; Robert H. Maybury, Project Officer.

IV. PROJECT HEADQUARTERS ADDRESS: UNESCO, P.O. Box 1425, Bangkok, Thailand, or UNESCO, Place de Fontenoy, Paris 7e, France.

V. PROFESSIONAL STAFF: M. Afzal, University Institute of Chemistry, The Mall, Lahore, West Pakistan; H. J. Arnikar, Head of the Chemistry Department, University of Poona, Poona, India; C. Bacungan, Philippine Science High School, Elliptical Road, Diliman, Quezon City, Philippines; R. Ben-Zvi, Hebrew University, Department of Biological Chemistry, Jerusalem, Israel; M. Chandavimol, Suan Kularb School, Bangkok, Thailand; V. A. Glushenkov, c/o Unesco, Ring Road 1, New Delhi, 3, India; B. Guevara, University of Santo Thomas, Chemistry Department, College of Science, Manila, Philippines; H. F. Halliwell, Department of Chemistry, University of Keele, Staffordshire, England; M. Hedayati, Planning and Curriculum Department, Ministry of Education, Teheran, Iran; D. Kashemsri, Supervisory Unit, Department of Secondary Education, Ministry of Education, Bangkok, Thailand; Khoo Chin Hock, Science Department, Malayan Teachers College, Glugor, Penang, Malaysia; Lee Hichul, Department of Chemical Engineering, Choongjoo Teaching College, Choongjoo City, Choongjoo Book, Korea; Le Xuan, Department of Education, Unesco EDS, Place de Fontenoy, Paris 7e, France; F. Mechner, Director of Research, Basic Systems, Inc., 880 Third Avenue, New York, N. Y. 10022; K. Nakanishi, Teacher's Consultant, Hyogo-Ken, Educational Research Centre, 3, Oji-Cho, Nada-ku, Kobe, Japan; M. N. Nawabi, Department of Chemistry, Faculty of Agriculture, Kabul University, Kabul, Afghanistan; Peng Yu-tsai, Department of Chemistry, Normal University, Taipei, Taiwan, Republic of China; A. M. Ranaweera, Science-Math. Development Project, Education and Research Branch, Department of Education, Colombo 2, Ceylon; J. Ratnaike, Science-Math. Development Project, Education and Research Branch, Department of Education, Colombo 2, Ceylon; A. D. Segaller, Woodstock, Forest Road, East Horsley, Leatherhead, Surrey, England; S. H. Siddiqi, Head of the Chemistry Department, University of Peshawar, Peshawar, West Pakistan; N. Spianchaiy, The College of Education, Prasarn-Mit, Bangkok, Thailand; L. E. Strong, Professor of Chemistry, Earlham College, Richmond, Ind., U.S.A.; S. Techakupuch, Department of Chemistry, Chulalongkorn University, Bangkok, Thailand; U. Tin Pe, State Training College for Teachers, Kanbe, Yankin P. O., Rangoon, Burma; J. P. Trivedi, Head of the Chemistry Department, St. Xavier's College, Ahmedabad 9, India; Rev. L.M. Yeddanapalli, Fr., Professor of Chemistry, Loyola College, Madras 34, India.

In addition, each of the following countries has established one or more cooperating study groups: Afghanistan, Burma, Ceylon, Republic of China, India, Iran, Israel, Japan, Korea, Malaysia, Nepal, Pakistan, Philippines, and Thailand.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: UNESCO
B. Funding agencies: UNESCO, United Nations, and Government of Thailand

VII. SPECIFIC PURPOSES AND OBJECTIVES:
1. Development of teaching materials in chemistry;
2. Encouragement, by demonstration, of indigenous curriculum reform in science among the countries of Asia.

A central aim of the project is that of getting teachers involved in their own course improvement. To this effect each participating country has established one or more study groups affiliated with the Pilot Project. These study groups will be kept in touch with the Pilot Project activities and consulted on a variety of questions. In addition, new course materials from various countries have been supplied so that study groups can undertake the analysis of these materials in relation to their own national development in chemistry teaching. It is the belief of UNESCO that each country can and should develop its own improvements appropriate to its own educational institutions.

Through the study groups it is hoped that the efforts initiated by the Pilot Project will be continued. Participants in the Pilot Project expect to return home and act as resource people and sources of inspiration for study groups.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Chemistry at upper secondary school level. Age range 15-18 years. No attempt has been made to form a complete course. Rather, topics were chosen that might separately be found useful to teachers within the framework of an existing course. Such topics include stoichiometry, energy, and kinetics. These will be presented through a laboratory approach stressing inquiry techniques. For each topic a kit of materials will be assembled that will provide a few weeks to a month of classroom instruction time.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION: Materials still being developed.

X. USE OF PROJECT MATERIALS: Not yet in use.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Probably the educational language of the countries participating.

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Chemistry Laboratory Experiments; 8mm Film Loops; Programmed Instruction; Teaching Notes.

XIV. MATERIALS AVAILABLE FREE: Policy to be established by UNESCO.

XV. MATERIALS PURCHASABLE: Policy to be established by UNESCO.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Trials with small groups of students. Further trials are expected in participating countries.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: The program itself is a teacher training one.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: Operational phase will be completed in July 1966. Continuing national projects under development.

I. PROJECT TITLE: Individual Mathematics Programme

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Australian Council for Educational Research, 9 Frederick Street, Hawthorn, E. 2., Victoria, Australia. December, 1964

III. PROJECT DIRECTOR: S. S. Dunn, Assistant Director, Australian Council for Educational Research - December 1964-March 1966; M. L. Clark, Assistant to the Director, Australian Council for Educational Research - March 1966.

IV. PROJECT HEADQUARTERS ADDRESS: Australian Council for Educational Research, 9 Frederick Street, Hawthorn, E. 2., Victoria, Australia

V. PROFESSIONAL STAFF: John F. Izard, Executive Officer. [Author panel comprising: John F. Izard, Don H. Goodger, Frank L. Smith, Brian D. Haig (to April 1966); Don J. Drummond (to September 1965); Graham J. Whitehead (from November 1965); Don J. Madden (from November 1965). Consultants: L. D. Blazely, Senior Research Officer, A.C.E.R.; R. H. Cowban, Education Department, Victoria; P. W. Hughes, Education Department, Tasmania; J. P. Keeves, Senior Research Officer, A.C.E.R.; S. S. Dunn, Professor of Education, Monash University (from March 1966).]

VI. PROJECT SUPPORT:
A. Organizational sponsorships: Australian Council for Educational Research, and State Education Departments.
B. Funding agencies: None.

VII. SPECIFIC PURPOSES AND OBJECTIVES: To develop text and assignment materials which permit individual progress through a modern mathematics program, based upon the outline of content which resulted from the Curriculum Officers' Conference at A.C.E.R., March 1964.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Elementary School Mathematics: Set A (Grades 1 & 2 approx.); Set B (Grades 3 & 4 approx.); and Set C (Grades 5 & 6 approx.).

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Set B for Grades 3 and 4 comprising: Placement

Test, Number Booklets and Answer Cards, Worksheet Pads, Mastery Test Pads, Assignment Cards and Answer Cards, Record Charts, Transparent Grids, Plastic Building Pegs, Gummed Paper Shapes, Clockface Stamp, Glue, Colored Pencils, Teacher's Handbook.
2. Information Bulletin.
3. Brochure.

X. USE OF PROJECT MATERIALS: The program is not complete, but Set B is being used by 12 teachers. Set B is available for purchase by Australian schools. Specific Schools where materials are used: Brunswick North Experimental School; Tullamarine State School; Parklands State School; and Essendon Grammar School, Victoria.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:
4. Set C for Grades 5 and 6.

XIV. MATERIALS AVAILABLE FREE: Nos. 2 and 3 from Australian Council for Educational Research.

XV. MATERIALS PURCHASABLE: No. 1 above, $60 (Australian currency) nett. per set, available from Australian Council for Educational Research or from the Publishers - Rigby Limited, Adelaide, South Australia. Cost does not include freight (45 lb. wt.).

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Trial materials were tested over a three-year period in a total of 6 schools with about 800 children. Reports on the effectiveness of the materials were made by participating teachers. Long term follow-up study details have not yet been finalized.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Teacher's Handbook (72 pages) included in No. 1 above.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: Development of Kit C for Grades 5 and 6, and investigation of feasibility of Kit A for Grades 1 and 2.

I. PROJECT TITLE: Junior Secondary Science Project

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: The Science Standing Committee of the Victorian Universities and Schools Examination Board, in conjunction with the Australian Council for Educational Research. February, 1966.

III. PROJECT DIRECTORS: J. Turner, University of Melbourne, Chairman of the Science Standing Committee; W. C. Radford, Director of the Australian Council for Educational Research.

IV. PROJECT HEADQUARTERS ADDRESS: Junior Secondary Science Project, Australian Council for Educational Research, Frederick Street, Hawthorn. E. 2, Victoria, Australia.

V. PROFESSIONAL STAFF: L. G. Dale, Executive Officer; R. Robinson, writer; G. Wilkinson, writer.

VI. PROJECT SUPPORT:
A. Organizational sponsorships: Victorian Universities and Schools Examination Board; Australian Council for Educational Research.
B. Funding agencies: Ian Potter Foundation; Percy Baxter Charitable Trust; Victorian Department of Education.

VII. SPECIFIC PURPOSES AND OBJECTIVES: To prepare materials that can be used in the classroom by pupils in Forms 1 to 4 of Victorian Secondary Schools (ages 12 - 16), under teachers' guidance, such that: pupils can proceed at their own rate; differences in learning rate are provided for; and revision of the material, by teachers or project writers, is facilitated.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Science, embracing chemistry, physics, biology, astronomy, geology; Grade 7 (Form 1) - 1966; Grades 8 - 10 (Forms 2 - 4) 1967-1969.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Teacher's Guide - General information on the materials
2. Student's Guide - Introduction to the materials
3. Unit 1: cards and associated work sheets for classroom use

4. Teacher's Guide to Unit 1.

X. USE OF PROJECT MATERIALS: Twenty-five teachers are using the program. Specific schools where materials are used: Methodist Ladies' College, Glenferrie and Barkers Roads, Kew, Victoria; Caulfield Grammar School, 217 Glen Eira Road, East St. Kilda, Victoria; and Rosebud High School, Eastbourne Road, Rosebud, Victoria.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: It is proposed to develop Units 1 - 10 in 1966. Each of these covers approximately 4 weeks and the ten units cover the year's work for Form 1 (Grade 7).

XIV. MATERIALS AVAILABLE FREE: It is not intended that materials will be distributed at this stage. Materials now being developed will be tried out in 1966, rewritten, and retried in 1967. From February 1967, sample materials may be made available.

XV. MATERIALS PURCHASABLE: None

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: In 1966 materials being developed for Form 1 are being tried in 25 classes. This trial is designed to evaluate the feasibility of the materials. In 1967 the Form 1 materials will be given a more thorough trial before being rewritten for release to schools generally. Teacher evaluation is being provided in the form of written comments on a copy of the materials provided for that purpose, and discussion with observers. Observers will be used in most schools, involving a person competent in science teaching from within the school. Observers from the writing team will closely observe 11 of the 25 trial classes. Student questionnaires will be provided to selected classes for each unit. Each unit will be tested to evaluate the extent to which the stated objectives have been achieved.

It is hoped that tests can be developed to test progress in development of non-cognitive objectives.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: No plans have yet been finalized.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: The project has barely begun. Unit 1 is ready for distribution to schools; Units 2, 3, 4 are in preparation.

XIX. PLANS FOR THE FUTURE: See items VIII and XIII above.

I. PROJECT TITLE: Education Department of Victoria Technical Schools' Science Courses, Forms 1-4

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: E. T. Jackson; R. A. Armitage. 1960

III. PROJECT DIRECTOR: R. A. Armitage

IV. PROJECT HEADQUARTERS ADDRESS: Technical Schools' Branch, Education Department of Victoria, Treasury Place, Melbourne, C. 2, Australia.

V. PROFESSIONAL STAFF: David Cohen, Research Officer, Education Department; G. Burmeister, Head of Science Dept.; J. Thomas, Chemistry Teacher/Lecturer in Science Method; G. Shirreff, Head of Science Dept.; R. Grose, R. Chapman, B. O'Neill, Science Teachers.

VI. PROJECT SUPPORT: Education Department

VII. SPECIFIC PURPOSES AND OBJECTIVES: To develop general science courses for Forms 1-4 (i.e., grades 7-10) for all pupils (girls and boys) attending the state's eighty technical schools.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: General Science, grades 7-10.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Science Syllabus Form 1
2. Science Syllabus Form 2
3. Science Syllabus Form 3
4. Science Syllabus Form 4

X. USE OF PROJECT MATERIALS: Approximately 600 teachers are using complete program, and probably 100 are using portions of it. Specific schools where materials are used: Preston East Technical School; Fawkner Technical School; Coburg Technical School; Geelong West Technical School.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Accompanying sample external tests.

XIV. MATERIALS AVAILABLE FREE: Single copies of each syllabus, in limited numbers. Write Technical School Branch, Education Department.

XV. MATERIALS PURCHASABLE: None

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Pretrials in six schools, and modified on basis of teachers' subjective feedback. Limited resources available prevent adequate valid evaluation materials from being developed.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: The Science Teachers' Association of Victoria has organized several seminars and meetings. Otherwise, syllabuses have been written to include as much explanatory material as possible.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Form 4 syllabus now completed.

XIX. PLANS FOR THE FUTURE: Revision of Forms 1-4 syllabuses, based on the five years of teaching so far.

I. PROJECT TITLE: Victorian Matriculation Chemistry

II. PRINCIPAL ORIGINATOR: A. S. Buchanan, Head, Department of Chemistry, University of Melbourne

III. PROJECT DIRECTOR: A. S. Buchanan

IV. PROJECT HEADQUARTERS ADDRESS: Chemistry Department, University of Melbourne, Australia

V. PROFESSIONAL STAFF: D. R. Stranks, Professor of Inorganic Chemistry, University of Adelaide; P. T. McTigue, Senior Lecturer in Physical Chemistry, University of Melbourne; K. C. LeeDow, Lecturer in Chemistry, Secondary Teachers' College, Melbourne; G. R. A. Withers, Senior Chemistry Master, Melbourne Church of England Grammar School; M. L. Heffernan, Senior Lecturer in Chemistry, Monash University. The working group, drawn from universities, schools, and teacher training institutions worked full time for one year on the project. They were paid their normal salaries by sponsoring groups and institutions. They received no royalties from sales of materials, this finance going to further development of chemistry teaching, and to partially subsidize materials to enable high quality textbook production at moderate cost.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: University of Melbourne.
B. Funding agencies: Thomas Baker (Kodak); Alice Baker and Eleanor Shaw benefactions, together with contributions from the Royal Australian Chemical Institute, and eight Australian industrial companies.

VII. SPECIFIC PURPOSES AND OBJECTIVES: Thorough revision and re-appraisal of curriculum of final year school chemistry; preparation of a student text and of a student practical manual for the new course; preparation of materials for teachers for the course; development of suitable examination papers.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Matriculation (final year of secondary school) chemistry in Victoria (corresponds roughly to first year college chemistry in many U. S. institutions).

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Textbook: Stranks et. al., Chemistry - A Structural View (Melbourne Univ. Press 1965); in England: Cambridge Univ. Press; in Canada: Macmillan.
2. Practical Manual: Withers, Practical Manual to accompany above text (Melbourne Univ. Press 1965).
3. Teaching Notes: LeeDow et. al., Teaching Notes to accompany both the above.
4. Syllabus of the course, and notes on the scope and method of treatment.

X. USE OF PROJECT MATERIALS: Over 300 teachers are using the complete program, and about 100 teachers are using portions of it. The above figures are for Victoria only. The books are prescribed for first year chemistry at the University of Sydney in New South Wales and are being used in New Zealand and Scotland. Some specific schools where material is being used: all Victorian secondary schools.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Possibly German and Swedish

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:
5. Trial examination papers

XIV. MATERIALS AVAILABLE FREE: Items 4 and 5 above, from the Victorian Universities and Schools Examinations Board, 437 St. Kilda Road, Melbourne, Victoria, Australia.

XV. MATERIALS PURCHASABLE: Items 1, 2, and 3 from publishers indicated in IX. Textbook: $6.00 (Aust.); Practical Manual: $1.75 (Aust.); Teaching Notes: $2.00 (Aust.).

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Continual appraisal of progress in schools through a Standing Committee in Chemistry, of the Victorian Universities and Schools Examination Board.

XVII. SPECIFIC PLANS FOR TEACHER EDUCATION: In-service courses for teachers have been held in Melbourne and in a number of Victorian country centers.

XVIII. PROJECT ACTIVITIES SINCE 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: Further and more extensive courses of teacher preparation; and revision of syllabus and teaching materials within three years.

I. PROJECT TITLE: Science Teaching Center of Bahia (Centro de Ensino de Ciências da Bahia - CECIBA)

II. PRINCIPAL ORIGINATORS: University of Bahia, the Government of the State, and Ministery of Education

III. PROJECT DIRECTOR: José Walter Bautista Vidal

IV. PROJECT HEADQUARTERS ADDRESS: Rua Aristides Novis, 2, Escola Politécnica, 8° andar, Salvador, Bahia, Brasil

V. PROFESSIONAL STAFF: Martha Maria de Souza Dantas, Mathematics Coordinator; Antonio Celso Spinola, Chemistry Coordinator; Luiz Felipe Perret Serpa, Physics Coordinator; Julieta Fahel Guimarães, Biology Coordinator.

VI. PROJECT SUPPORT:
A. Organizational sponsorships: Ministery of Education, University of Bahia and State Government
B. Funding agencies: None listed

VII. SPECIFIC PURPOSES AND OBJECTIVES: Intensive Training Courses (winter and summer vacations); Special courses about specific subjects; Research on higher levels for national and foreign professors; Educational radio and T.V.; Science Fairs; Production of scientific material; Publications, Seminars, etc.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Our projects pertain to high school level.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Tests
2. Books
3. Summary of the intensive courses

X. USE OF PROJECT MATERIALS: 20 teachers are using the complete program and 15 others are using some of the materials. Specific schools where materials are used: Colégio Estadual da Bahia (State College); Colégio Estadual Severino Vieira, Colégio dos Maristas.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Portuguese

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Equipment for Laboratories.

XIV. MATERIALS AVAILABLE FREE: Nos. 1, 2 and 3.

XV. MATERIALS PURCHASABLE: None described

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Asking teachers and students' opinions, through questionnaires and interview with selected students and teachers, and with the help of statistical analysis.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Intensive courses - 10 days approximately; 5 weeks courses during summer and winter vacations; States of Bahia (Capital and Interior), Sergipe and North of Minas Gerais.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: Continuation of each of the activities listed in question VII.

The Science Teaching Center of Bahia is but one of several new centers established for the purpose of improving science education in Brazil. Similar activities are in progress at each of the centers. Persons desiring further information may contact them directly at the following addresses:

1. Centro de Ensino de Ciências do Nordeste (CECINE)
   Diretor Executivo: Professor Marcionilo Lins
   Cidade Universitária - Engenho do Meio
   Caixa Postal 2047
   Recife - PERNAMBUCO, Brazil
2. Centro de Treinamento de Professôres de Ciências de Minas Gerais (CECIMIG)
   Diretor Executivo: Professor Jenner Procópio de Alvarenga
   Rua Carangola, 288 - 5° andar - sala 518
   Caixa Postal 253
   Bolo Horizonte - MINAS GERAIS, Brazil
3. Centro de Treinamento de Professôres de Ciências da Guanabara (CECIGUA)
   Diretor Executivo: Professor Ayrton Gonçalves da Silva
   Colégio Estadual João Alfredo
   Av. 28 de Setembro, 109
   Rio de Janeiro - GUANABARA (ZC-11), Brazil

4. Centro de Treinamento de Professôres de Ciências de
Sao Paulo - (CECISP)
Diretor Executivo: Professôra Myriam Krasilchik
Caixa Postal 2921
São Paulo - SÃO PAULO, Brazil

5. Centro de Treinamento para Professôres de Ciências do
Rio Grande do Sul (CECIRS)
Diretor Executivo: Professor Luiz Settineri
Colégio Estadual Júlio de Castilhos
Av. João Pessoa - Praca Piratini s/n
Porto Alegro - RIO GRANDE DO SUL, Brazil

I. PROJECT TITLE: Semi-Conductors

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Paar Bergvall. 1964

III. PROJECT DIRECTOR: Antonio de Souza Teixeira, Jr., Head, Div. of Physics, Brazilian Institute for Education, Science and Culture (IBECC).

IV. PROJECT HEADQUARTERS ADDRESS: IBECC, P. B. 2921, Sao Paulo, Brazil.

V. PROFESSIONAL STAFF: Denitiro Watanake, Teacher, Application College of Faculty of Sciences, Sao Paulo; Mario Sanz Anguita, Teacher, IBECC, Sao Paulo.

VI. PROJECT SUPPORT: Centro de Treinamento de Professores do Est., Sao Paulo (CECISP). Faculty of Philosophy, Sciences and Letters, University of Sao Paulo - Instrumentation to Teaching Department.

VII. SPECIFIC PURPOSES AND OBJECTIVES: To teach semiconductors in high schools.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Sub-graduate or Professional (Electronics, Electrotechnics) courses.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION: Power supply - $20.00 (U.S.); Multimeters - $50.00; Potentiometers (1000 ohms, 500 ohms, 250 ohms, 100 ohms) - $4.00; Lamp (100 w), carbon wire type - $0.50; Weld iron - $3.00; Lamp (100 w), carbon wire filament - $2.50; NTC - $0.50; LOR - $0.50; Transistor (OC-70 or OC-71) - $1.00; Diode (OA-70 or OA-71)- $1.50; Electric heater - $0.50; Aluminum vessel - $1.50; 0.5m wire, no. 20, 30, 40 - $1.50.

X. USE OF PROJECT MATERIALS: Ten instructors are using the materials at IBECC in courses for teachers.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Portuguese

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Possibly English and French.

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Power supply, kits, and textbooks.

XIV. MATERIALS AVAILABLE FREE: None described.

XV. MATERIALS PURCHASABLE: See items in IX.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: None described.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Courses in 2nd semester, 1966, for 20 teachers, in 20 hours.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Writing a textbook; building kits with components; slides about Hall-effect.

XIX. PLANS FOR THE FUTURE: Crystals - kit and textbook; Semi-conductors - lectures and conferences for teachers.

I. PROJECT TITLE: Natural Science Program in General Education

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: York University. September, 1963

III. PROJECT DIRECTOR: Thomas H. Leith, Coordinator

IV. PROJECT HEADQUARTERS ADDRESS: York University, 4000 Keele Street, Toronto, Ontario, Canada

V. PROFESSIONAL STAFF: Thomas H. Leith, Coordinator; Fred H. Knelman, Associate Professor; Michael G. Boyer, Brian Colman, C. Brian Cragg, Assistant Professors; Ian A. Brookes, Lecturer; 10 Instructors, Senior Demonstrators, and Demonstrators.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: York University
B. Funding agency: Federal and Ontario Provincial Government

VII. SPECIFIC PURPOSES AND OBJECTIVES: To establish and offer curricula in science for non-science majors at York University day and evening programs. The curricula are established to meet a variety of interests and high school preparations.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: All courses at present, in the day program, are suitable for freshmen. If a student elects a second of these courses he or she takes it as a sophomore. In the evening college they form part of the required interdisciplinary core required of all students before proceeding to major courses.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Syllabus for Nature and Growth of the Physical Sciences
2. Syllabus for Principles of the Physical Sciences
3. Varied materials for Earth and Life

X. USE OF PROJECT MATERIALS: 16 teachers are using various portions of the materials at York University.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: More advanced courses in:

4. Science and Society, and
5. Problems in the History and Philosophy of Science

XIV. MATERIALS AVAILABLE FREE: Nos. 1 and 2.

XV. MATERIALS PURCHASABLE: None

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: By student reaction and by both a science division committee and by directors of other courses in the York general education curriculum. Questionnaires to students and occasional meetings of the above faculty groups.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION Used in evening program (and the connected summer school) in classes containing many teachers, particularly those in elementary school.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: None

XIX. PLANS FOR THE FUTURE: Summer work on curricula and laboratory/demonstration work by our team.

I. PROJECT TITLE: CAAS School Biology Project

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: Ceylon Association for the Advancement of Science, with the cooperation of the Ministry & Department of Education, Ceylon. 1964

III. PROJECT DIRECTOR: V. Basnayake

IV. PROJECT HEADQUARTERS ADDRESS: Ceylon Association for the Advancement of Science, 55 Torrington Square, Colombo 7, Ceylon.

V. PROFESSIONAL STAFF: Honorary Committee of 15, consisting of university biologists, educationists, school biology teachers, etc. Chairman: S. W. Bibile, Professor of Pharmacology, University of Ceylon, Peradeniya.

VI. PROJECT SUPPORT: Financial grant from the Ministry of Education (Aid: the Asia Foundation); equipment from the Ministry & Department of Education.

VII. SPECIFIC PURPOSES AND OBJECTIVES: To improve the teaching of biology in Ceylon schools at the General Certificate of Education, Ordinary Level.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Biology, G.C.E.O. Level, a two-year course, concurrently with other subjects, including chemistry and physics. Average age of students, 14-16 years.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION: The materials are in cyclostyled form and incomplete as yet.

1. Teacher's Guide
2. Student's Exercises
3. Gleanings from biological work done in Ceylon
4. Problems - sample discussions on scientific method based on biological investigations pertaining to Ceylon

X. USE OF PROJECT MATERIALS: The materials are not in school use.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Sinhalese and Tamil

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Completion of the four volumes mentioned in IX.

XIV. MATERIALS AVAILABLE FREE: A few copies of the cyclostyled volumes mentioned in IX can be made available to professional organizations.

XV. MATERIALS PURCHASABLE: None

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: No specific plans yet.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: No specific plans yet.

XVIII. PROJECT ACTIVITIES SINCE 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: Completion of the volumes already mentioned, and Student's Text.

I. PROJECT TITLE: Mathematics Development Project

II. PRINCIPAL ORIGINATOR: The Department of Education, Ceylon.

III. PROJECT DIRECTOR: The Director of Education

IV. PROJECT HEADQUARTERS ADDRESS: Mathematics Development Project, 420, Bullers Road, Colombo 7, Ceylon.

V. PROFESSIONAL STAFF: 14 academic staff comprising experienced teachers in Grades 6 through 10.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: The Government of Ceylon.
B. Funding agencies: The Government of Ceylon; The Asia Foundation.

VII. SPECIFIC PURPOSES AND OBJECTIVES: Revision of math curriculum in secondary schools; production of detailed scheme of work for teachers; production of pupil's textbooks; introduction of mathematics to all secondary schools; in-service training of secondary school mathematics teachers.

All schools in Ceylon are controlled by a central body. There are over 9,000 schools of which 6,000 have classes up to grade 10. Of these 6,000 schools only about 1,000 were teaching mathematics. The others taught only arithmetic. One of the objectives of this project has been to introduce mathematics to all these schools. This introduction was done at the beginning of 1966. Since there were no qualified mathematics teachers to man all these schools, very detailed schemes of work had to be prepared.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Mathematics: Grades 6 through 10 (age group -11 + to 15 +).

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Revised Schemes of Work - Grade 6
2. Detailed Scheme of Work for Teachers - Grade 6

X. USE OF PROJECT MATERIALS: Approximately 12,000 teachers are using the complete program. Specific schools where the materials are used: All 6,000 secondary schools in the country. [Note: Teachers have been given the option of using any other scheme of work provided it covers the same content area as the one produced by this project.]

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Sinhala and Tamil.

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:
3. Pupils' Textbook - Grade 6
4. Revised Scheme of Work - Grade 7
5. Detailed Scheme of Work for Teachers - Grade 7

XIV. MATERIALS AVAILABLE FREE:
2. (only a very limited number of copies). From address listed in IV.

XV. MATERIALS PURCHASABLE: None

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Selected teachers are reporting periodically. Evaluating instruments are being prepared. These will take the form of paper and pencil tests to be administered towards the end of this year and in subsequent years.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: The project members conduct intensive six-day vacation courses for selected teachers, who in turn conduct week-end classes for teachers throughout the country.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: Production of bulletins covering both academic and professional aspects of mathematics teaching.

I. PROJECT TITLE: Program of Improvement (Programa de Profecciemento) - Santiago, Chile

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: For science area, Abraham S. Fischler. October 1963

III. PROJECT DIRECTOR: Hector Croxatto, Coordinator

IV. PROJECT HEADQUARTERS ADDRESS: 439 Castro, Santiago, Chile

V. PROFESSIONAL STAFF: Dario Moreno, Chairman, Science Department; Louis Cappuro; R. Espenozo; Al Braswell

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Ministry of Education
B. Funding agency: Ford Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: To develop a new K-12 science program and to build ways of modernizing in-service teacher education.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Language arts, social studies, mathematics and science are included in grades kindergarten through 12.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION: The first materials are available for grades 1-2 of the elementary school and grade 7 of the junior high school.

X. USE OF PROJECT MATERIALS: This will be decided in experimental schools during the year 1966.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Spanish

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: English

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Ultimately a totally new science program will be developed.

XIV. MATERIALS AVAILABLE FREE: None described

XV. MATERIALS PURCHASABLE: None described

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS. It will resemble the AAAS process approach.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: An in-service training program is being developed. It will handle roughly 80 teachers at a time for three month periods. Thus, it will train 320 teachers a year in the area of science. These teachers will come to Santiago and live in dormitories and continue to draw their pay from the Ministry.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: During the month of March a short one month course was organized for seventh grade teachers, since the seventh grade is now becoming part of the elementary schools organization. This move was an attempt to try to keep children in school at least one year longer. Ultimately the plan is to have nine years of education before specialization.

XIX. PLANS FOR THE FUTURE: None described.

I. PROJECT TITLE: Production of BSCS materials translated and adapted to the Tropical Environment.

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: This project originated at the University of Colorado, Boulder, during the second BSCS writing conference in 1961.

III. PROJECT DIRECTOR: Humberto Gómez.

IV. PROJECT HEADQUARTERS ADDRESS: Universidad de Antioquia, Medellín, Colombia, S. A.

V. PROFESSIONAL STAFF: Roberto Galán, Professor of Biology, Universidad de los Andes, Bogotá; José Vicente Alvarez, Director "Editorial Norma", Cali, Colombia; Gabriel Roldán, Professor of Biology, Universidad de Antioquia.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: At the present time, this is a self-sustained program.
B. Funding agency: The Ford Foundation gave its support to initiate the program.

VII. SPECIFIC PURPOSES AND OBJECTIVES: To produce modern biology materials for secondary school students. Simultaneously we have been working with the secondary school teachers, training them in how to use the new materials. We have also translated the BSCS Biology Teacher's Handbook and the Teacher's Guide. We are working with the BSCS Green Version in Spanish.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Secondary school materials for students 14-15 years of age. These are usually 9th to 10th grade. Some trials have been made with pre-university students during their first year biology course.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. "Curso de Biología", Spanish edition of the BSCS Green version.
2. "Manual para profesores de Biología", Spanish translation of the BSCS Teacher's Handbook. In print, ready in November 1966.
3. "Guia para el profesor", Spanish edition of the BSCS Teacher's Guide. In print, ready in December 1966.

X. USE OF PROJECT MATERIALS: Around 100 teachers are using the complete program and 200 others are using some of the materials. Specific schools where the materials are used: Estudios Generales; Universidad de Antioquia; Universidad de los Andes; Universidad del Valle; Instituto Pedagógico Nal. Instituto Pedagógico.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Spanish

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: 4. Pamphlets on Biology subjects.

XIV. MATERIALS AVAILABLE FREE: Nos. 1, 2, 3. Order from: "Editorial Norma", Cali, Colombia, S. A. Free in small numbers (four of each).

XV. MATERIALS PURCHASABLE: Nos. 1, 2, 3 in lots of five or more, same address.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: We are developing impact and achievement tests. These have been tried out among pre-university students.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Each of the centers where the materials have been used has established a formal training program for secondary school teachers. This program may be completed in one of the following ways: (1) one semester course with an average of 160 hours; (2) one summer course; (3) annual program with an average of 200 hours. We usually divide these courses into levels I and II, the former being a pre-requisite to attend the latter.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: None previously reported.

XIX. PLANS FOR THE FUTURE: We have established at this University a program of basic physics and chemistry for science teachers to start June 20, 1966. In August, 1966 we will have our II level BSCS course. During July and August, 1966, a summer course will be held in Quito, Ecuador, using our materials.

I. PROJECT TITLE: Center for Modernization of Mathematics and Physics Teaching (Kabinet pro modernizaci vyučování matematice a fyzice)

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Jednota československých matematiků a fyziků (Union of Czechoslovak Mathematiciens and Physicists), Valdštejnské nám. 4, Praha 1, Czechoslovakia. Began toward the end of 1965.

III. PROJECT DIRECTOR: Miloslav Valouch, Professor of Physics, Fakulty of Mathematics and Physics of the Charles University, Ke Karlovu 5, Praha 1, Czechoslovakia.

IV. PROJECT HEADQUARTERS ADDRESS: Kabinet pro modernizaci vyučování matematice a fyzice, Žitná 25, Praha 1, Czechoslovakia.

V. PROFESSIONAL STAFF: About sixty university and high school teachers and scientific workers serve as steering committee members, consultants and writers working in the Center at various times.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Jednota československých matematiků a fyziků (Union of Czechoslovak Mathematiciens and Physicists).
B. Funding agencies: Czechoslovak Academy of Science and Ministry of Education.

VII. SPECIFIC PURPOSES AND OBJECTIVES: The major objective of the center program is to stimulate and to organize the theoretical and experimental research concerning the possibilities of essential heightening of the social effectiveness of mathematics and physics teaching with regard to the prospective needs of a highly developed society. The results of the research will serve as foundation for successive modernization of teaching in primary and secondary schools executed by state educational authorities and for the improvement of pre-service and in-service education of teachers.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: At present, the work has begun with the study of the general objectives of the education in mathematics and physics and some preliminary experimental texts are prepared, for mathematics in grades 1, 2 and 6 and for physics in grade 7 of the Fundamental nine-year school.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Introduction to Modern Mathematics, a preliminary experimental text for more bright students in grade 6, Part I and Part II.
2. Combinatorics, a preliminary experimental text to be examined separately in grades 7 and 8 (for more bright students).
3. Relations, a preliminary experimental text to be examined separately in grades 7 and 8 (for more bright students).

X. USE OF PROJECT MATERIALS: About 25 especially instructed teachers are using the materials. Specific schools where materials are used: Fundamental nine-year schools in Praha, Brno and Bratislava.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: In Czech and Slovak.

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: The experimental materials (1-3) will not be translated in other languages. A preliminary report on the work of the center will be prepared for the second half of 1967.

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:
4. Newsletters of the Center (in Czech) containing information mainly for interested persons in Czechoslovakia.

XIV. MATERIALS AVAILABLE FREE: Items 1 - 4 as long as limited supply lasts.

XV. MATERIALS PURCHASABLE: None

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: A preliminary system of tests to the topics mentioned in IX is being prepared and examined in experimental schools.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: At present, only teachers in selected experimental schools are specially trained. A broader program of inservice courses is being prepared in the Union of Czechoslovak Mathematiciens and Physicists.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: To develop the work on the program of the center. Special attention will be paid to problems concerning introduction of modern topics at different age stages including the first steps of basic science education of elementary school children.

I. PROJECT TITLE: Nuffield Science Project Combined Science

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Nuffield Foundation. September, 1965

III. PROJECT DIRECTOR: C. D. Bingham

IV. PROJECT HEADQUARTERS ADDRESS: Room 213, Haworth Building, Birmingham University, Birmingham 15, England

V. PROFESSIONAL STAFF: C. D. Bingham, Organiser, and M. J. Elwell, Assistant Organiser.

VI. PROJECT SUPPORT: Nuffield Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: Introductory Science for 11-13 age group. A combined science approach leading into "O" level projects at age 13 in Biology, Chemistry, Physics, and Secondary Science.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Science - 11-13 years. "O" level grade.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Synopsis
2. Teachers' Guide - Sections 1-4.

X. USE OF PROJECT MATERIALS: Approximately 80 teachers in 26 trial schools are using the complete program.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:
3. Teachers' Guide - Sections 5-9
4. Pupils' Book - Sections 1-9

XIV. MATERIALS AVAILABLE FREE: To trial schools only.

XV. MATERIALS PURCHASABLE: Not yet available, but when available from: Mary Ward House, Tavistock Place, London, W.C. 1, England

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Trial schools, briefing conferences, observations from Schools Council, and weekly reports from all teachers using the trial version.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Briefing conference at Worcester College of Education, Worcester, July 19 - 26, 1966.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE:
Publications - September 1968
Trials completed - July 1968

I. PROJECT TITLE: Nuffield Junior Science Teaching Project

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: The Nuffield Foundation. January, 1964

III. PROJECT DIRECTOR: E. R. Wastnedge

IV. PROJECT HEADQUARTERS ADDRESS: Tavistock House, South, Tavistock Square, London, W.C. 1, England

V. PROFESSIONAL STAFF: Team Leaders: W. E. Betts; R. W. Carlisle; R. W. Stockdale; J. W. Bainbridge; M. Hardstaff; A. Morgan; F. F. Blackwell was a Team Leader throughout 1964; J. Howard joined the team for a term to make films.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Nuffield Foundation
B. Funding agency: Nuffield Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: To help those who wish to use science as an educational tool in the teaching of children in the age range 5 to 13 years.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Age range, 5 to 13 years.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
Interim Publications
1. Teachers' Guide
2. Book of Case Histories
3. Teachers' Background Information Booklets
4. Loops - "Insect Cages"
5. Loops - "Small Mammals"

X. USE OF PROJECT MATERIALS: Specific schools where materials are used: Northfield House Primary School, Leicester; Witham-on-the-Hill Primary School, nr. Bourne, Lincolnshire; Earby Junior School, nr. Skipton, Yorkshire.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Rewriting of Nos. 1, 2 & 3.
6. Book of Home-Made Apparatus
7. Book of Animals & Plants

XIV. MATERIALS AVAILABLE FREE: News Letters. From Project address.

XV. MATERIALS PURCHASABLE: To the limit of available material, Nos. 1, 2 and 3 at 19 shillings and 6 pence (19/6) for the set.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: The Schools' Council of the Dept. of Education and Science is to set up an evaluation group. The interim materials are on trial in about 1,000 classrooms. Feedback is helping to rewrite materials.

Preparation of teachers is being done by national and local courses. Meetings for discussion and courses in teachers' centers are established locally. Teachers try the work in classrooms. Area leaders send in a General Report each term. Teachers submit a diagrammatic summary of work - details given as and when required.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Leaders from each area attend national courses where they concentrate on ways of working. Then they return to their home area and help with similar courses locally to extend field of training. In each area, a center has been established where teachers meet, discuss, do practical work, attend courses, lectures, and review new books and apparatus.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: Project ends in December, 1966. Final publications available generally in Spring, 1967.

I. PROJECT TITLE: Nuffield Mathematics Teaching Project (Age-range 5 to 13)

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Nuffield Foundation. September, 1964

III. PROJECT DIRECTOR: Geoffrey Matthews

IV. PROJECT HEADQUARTERS ADDRESS: 12, Upper Belgrave Street, London, S.W. 1, England

V. PROFESSIONAL STAFF: The writing team have been seconded from, or are working part-time at the following jobs: Writing Team 64-66: H. Fletcher, Inspector of Schools; J. W. G. Boucher, Headmaster of Primary School; B. M. Mogford, Lecturer at Teacher Training College; G. B. Corston, Inspector of Schools (formerly Headmaster of Primary School); B. A. Jackson, Inspector of Schools (formerly infant teacher). New Team, 1966: I. Campbell, Lecturer at College of Education; R. K. Tobias, Teacher in a secondary school; D. R. Brighton, Teacher in a secondary modern school; J. H. D. Parker, Head of mathematics department in secondary modern school; A. G. Vosper, Lecturer at Teacher Training College. D. E. Mansfield, Editor of Bulletin.

VI. PROJECT SUPPORT:
A. Organizational sponsorships: Nuffield Foundation and Schools Council
B. Funding agency: Nuffield Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: The object is to produce a contemporary course in mathematics for children from 5 to 13. This will be designed to help them connect together many aspects of the world around them, to introduce them gradually to the processes of abstract thinking, and to foster in them a critical, logical, but also creative, turn of mind.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Mathematics: Age-range 5 to 13.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Eight draft Teachers' Guides: Computation and Structure ②, Beginnings ①, Pictorial Representation $\boxed{1}$, Shape and Size ▽2, I do and I understand ■, Desk Calculators 1 ▼, Beginnings ▽1, How to make a pond 2 ▼.

2. 16mm film called "I Do and I Understand". Shows a mathematics class at work in a school in Blackpool.
3. "Multiboard".
4. Bulletin: A report on plans and progress of the Project.

X. USE OF PROJECT MATERIALS: Approximately 2,070 teachers used complete program in 1965. In September, 1966, approximately 11,500 teachers will use the materials. Specific schools where materials are used: Middle Row Junior Mixed School, Kensal Road, North Kensington, London, W. 10; New City Primary School, New City Road, Plaistow, London, E. 13.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: No. 2, film into Italian.

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:
5. Eight further Teachers' Guides: Graphs leading to Algebra $\boxed{2}$, Statistics and Probability $\boxed{3}$, Computation and Structure ③ and ④ , Shape and Size ▽3 and ▽4 , A Look Ahead 3 ▼, Space 4 ▼ . About twenty further guides in 1968 to 1970.

XIV. MATERIALS AVAILABLE FREE:
2. Film on free loan in U. K. from Petroleum Film Bureau, 4, Brook Street, Hanover Square, London, W.1.

XV. MATERIALS PURCHASABLE:
1. The first (revised) Teachers' Guides should be ready for general publication some time during 1967.
2. Film obtainable from Sound Services Ltd., Wilton Crescent, Merton Park, London, S.W. 19, for the price of 9 10s 3d.
3. Multiboard obtainable from manufacturers, E. Marshall Smith (School Utilities) Ltd., Attn. of J. Kennard), 5-9, Church Lane, Romford, Essex, for 6 7s 6d.
4. Bulletin obtainable from M. F. Jack, Fanfare Bureau, 516, Forest Road, London, E. 17. Cost is 1s 2d plus postage on receipt of invoice.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Feedback is being obtained by written reports and personal liaison with the pilot areas. The work is being tried out in 14 pilot areas, comprising 230 schools, starting in September, 1965. About 60 more "second-phase" areas are starting in September, 1966. Systematic evaluation of understanding by both teachers and children is in the planning stage. This will include Teachers' Guides giving specific "check-up" procedures.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Courses are being run by the Schools Council for key teachers taking part in the project, and further courses are being run by local education authorities. Guides are being supplied to lecturers in teacher-training establishments.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: The writing team meets approximately once a month for a full editorial conference. A conference of organisers from both pilot and second-phase areas (involving altogether about 300 people) is planned for April, 1967.

I. PROJECT TITLE: Nuffield Physics Project

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: The Nuffield Foundation, London, England. 1962

III. PROJECT DIRECTOR: Eric Rogers

IV. PROJECT HEADQUARTERS ADDRESS: Nuffield Foundation Science Teaching Project, 5-7, Tavistock Place, London, W. C. 1, England

V. PROFESSIONAL STAFF: Eric Rogers, Organiser; J. L. Lewis, Malvern College, Worcestershire; E. J. Wenham, Worcester College of Education, Associate Organisers; D. W. Harding, Assistant Organiser.

VI. PROJECT SUPPORT: Nuffield Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: Development of a five-year physics course for 11-16 year old children, with science presented as a part of general education. The program is designed to portray an accurate picture of the relevant ideas of modern physics while fostering a spirit of inquiry. Since the main emphasis is on the method of teaching, the teachers' guides play a most important role in the program. These appear in five volumes, one for each year of the course. For the pupils there are experiment guides and problem books rather than the conventional texts.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Physics, age 11 - 16.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Teachers' Guides I - V
2. Experiment Guides I - V
3. Apparatus Guide
4. Problem Books I - V
5. Kits of inexpensive apparatus

X. USE OF PROJECT MATERIALS: 50 schools used the materials in trials. The present number is unknown.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Undecided

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Work now beginning on physics specialist work for pupils aged 16 - 18.

XIV. MATERIALS AVAILABLE FREE: Progress report from Nuffield Foundation.

XV. MATERIALS PURCHASABLE: All books obtainable from Longmans, Green & Co., 48, Grosvenor Street, London, W. 1, England.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Evaluation from trials complete. Further evaluation with Schools Council.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: 100 courses in Summer, 1966.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: Advanced level work:

Preliminary Trials:	1966 - 1967
Full Trials:	1967 - 1969
Publication:	1969 - 1970

I. PROJECT TITLE: The School Mathematics Project

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: B. Thwaites; T. A. Jones; D. A. Quadling; T. D. Morris; H. M. Cundy. September, 1961

III. PROJECT DIRECTOR: B. Thwaites

IV. PROJECT HEADQUARTERS ADDRESS: The University, Southampton, England

V. PROFESSIONAL STAFF: A. G. Howson, Editor-in-Chief; A. Freeman, Secretary

VI. PROJECT SUPPORT: Funds are drawn from many British foundations and industrial companies.

VII. SPECIFIC PURPOSES AND OBJECTIVES: To create a curriculum for secondary school mathematics which will reflect the nature of modern mathematics and its applications.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Mathematics, 11-18; O and A levels.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION: Published texts by Cambridge University Press:
1. SMP Book 1 (for Form 1) and Teachers' Guide
2. SMP Book 2 (for Form 2) and Teachers' Guide
3. SMP Book T and Teachers' Guide
4. SMP Book T4 and Teachers' Guide
5. SMP Elementary Tables
6. SMP Advanced Tables
7. "We Built our own Computers"

X. USE OF PROJECT MATERIALS: Between 1,000 and 2,000 teachers in hundreds of schools in England are using the materials.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: English

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: SMP Books 3, 4, 5 - for O level; Books 6, 7 - for A level; SMP Monographs of special topics.

XIV. MATERIALS AVAILABLE FREE: Directors' Report (Annual)

XV. MATERIALS PURCHASABLE: Published texts from any bookshop: Book 1, 18s/6d; Book T, 17s/6d; Book T4, 21s; Teacher's Guide, Book T, 21s; Teacher's Guide, Book 1, 21s. Experimental texts from: The University Bookshop, The University, Southampton, England: Book 2, £1; Book 3, £1; Book 5, £1/10s; Book 6, £1/10s; Book 7, £1/10s; Winchester Calculus, £1/10s; Teacher's Guide, Book T4, 17s/6d.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: By constant revision and experience in the classroom by the principal authors.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: We organize many short (i.e. 3-5 day) conferences for teacher in-service training. In addition, members of the SMP have been on call for large numbers of lectures for teachers.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE:

Book	Draft Text Available for	Final Publication Planned for	Teacher's Guide Published in
1	-	June 1965	July 1965
2	1965/66	June 1966	July 1966
3	1965/66	June 1967	July 1967
4	1966/67	June 1968	July 1968
5	-	June 1969	July 1969
6	1965/66	June 1967	April 1968
7	1965/66	June 1968	April 1969
T	-	July 1964	April 1965
T4	-	July 1965	April 1966
Additional mathematics	1965/66	Part 1:Aug. 1966 Part 2:Jan. 1967	June 1967
Further mathematics	1966/67	June 1969	Dec. 1969

I. PROJECT TITLE: Curriculum project for special classes in chemistry and physics (biology), secondary school, fourth grade. (The first three grades use the same curricula as normal secondary schools.)

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Ministry of Education. March, 1966

III. PROJECT DIRECTOR: Karoly Garami

IV. PROJECT HEADQUARTERS ADDRESS: National Institute of Pedagogy, 17 Gorkij fasor, Budapest VII, Hungary.

V. PROFESSIONAL STAFF: Karoly Garami, Head of the Department of Chemistry, N.I.P.; Géza Tóth, Research Worker of the Department of Chemistry, N.I.P. Their work is aided by a commission of eight teachers from universities and secondary schools.

VI. PROJECT SUPPORT: Ministry of Education

VII. SPECIFIC PURPOSES AND OBJECTIVES: Evolving a level of knowledge, deeper and more expansive than it is general.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Formation of modern rudiments in physico-chemistry. Preparation for the final examination (maturity) of special secondary school classes.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION: For the present:
1. Stencilled topic of debate for an extensive conference, April 1966.
2. Typewritten draft for discussion in an exclusive commission, May 1966.

X. USE OF PROJECT MATERIALS: Project material is not used in schools at the present time. It will be initiated at four schools in September 1966, and used at 21 schools in 1967. This is because chemistry is not taught in the fourth grade of normal classes, and special classes will develop gradually.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Hungarian

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:
3. Experimental textbook (stencilled), ready by

September 1966.
4. Experimental textbook, revised, in rotaprint, ready by September 1967.

XIV. MATERIALS AVAILABLE FREE: No. 3 - available from the National Institute of Pedagogy in the next school year.

XV. MATERIALS PURCHASABLE: No. 4 - Educational Publishing Company (on behalf of the Ministry of Education) at a price fixed later.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Material will be evaluated by direct and indirect observations, by conferences of teachers using the program, and by test papers.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Teachers of the special classes can prepare for their tasks on the basis of the general plan for extension training. Forms of extension training are: individual study, conferences for working parties (in towns), two or three common discussions in counties and towns.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: Decision about the adoption of project will be made by the Ministry of Education on August 1, 1966.

I. PROJECT TITLE: OPI Mathematical Reform Project (Not an official title)

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: T. Varga. 1961

III. PROJECT DIRECTOR: No such function

IV. PROJECT HEADQUARTERS ADDRESS: National Institute of Pedagogy, Chair of Mathematics, Budapest VII, Gorkij fasor 17-21, Hungary.

V. PROFESSIONAL STAFF: A. Cser, Head of the Chair of mathematics; P. Gádor; S. Pálffy; T. Varga.

VI. PROJECT SUPPORT: National Institute of Pedagogy and Ministry of Education, Hungary.

VII. SPECIFIC PURPOSES AND OBJECTIVES: To develop a mathematical curriculum for mass education; To develop a mathematical curriculum for gifted pupils. Both are for grade levels K through 12.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: The subject is "mathematics as a whole". In traditional terms (gradually losing or changing their meaning): topics in arithmetic, algebra, geometry (plane and solid, synthetic and analytic), trigonometry and topics of "higher mathematics" (such as sets, logic, groups and other algebraic structures, topology, calculus, probability, statistics, information theory, game theory, mathematics for computers, etc.) are being integrated and gradually developed from elementary toward more sophisticated ideas and skills. Grade levels where effective classroom work was in progress in 1965-66: grades 1 and 3.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION: Worksheets, instructions for teachers (only preliminary versions).

X. USE OF PROJECT MATERIALS: Two teachers are using the complete program and an additional teacher is using some of the materials. Specific schools where the material is used: Budapest, V. Vaci utca 43. altalanos iskola; Budapest VIII. Jazmin utca 6. altalanos iskola.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Hungarian

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Further worksheets and teacher instructions.

XIV. MATERIALS AVAILABLE FREE: None listed

XV. MATERIALS PURCHASABLE: None listed

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Preliminary versions of worksheets are sometimes tested with a small sample of pupils before presenting them to a whole class, especially if doubts emerge on the part of the project staff. Worksheets are periodically revised. Towards the end of each year project classes are tested along with "normal" classes: (a) parallel classes, through tests based on traditional material and (b) classes of higher grade level where similar material is being taught as in project classes.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Summer courses and in-service courses during the school year are planned. Also, further materials for teachers.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported

XIX. PLANS FOR THE FUTURE: To develop the curriculum for further grade levels; To revise materials; To extend the work to further classes, especially to pupils of different ability groups and schools in different social environments, and to transfer some ideas and results to mass education.

I. PROJECT TITLE: Project for a Modern Teaching of Chemistry in Secondary Schools

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: OECD and Italian Ministry of Public Instruction. October, 1962

III. PROJECT DIRECTOR: Arnaldo Liberti, Head, Analytical Department, School of Chemistry, University of Naples

IV. PROJECT HEADQUARTERS ADDRESS: Instituto Chimico-Universita Napoli - Via Mezzocannone 4, Napoli

V. PROFESSIONAL STAFF: P. Pinc, University of Pisa; A. Fava, University of Pisa; G. Illuminati, University of Roma.

VI. PROJECT SUPPORT:
A. Organizational sponsorships: OECD (European Organization for Cooperation and Development), Paris; Italian Ministry of Public Instruction, Roma.

VII. SPECIFIC PURPOSES AND OBJECTIVES: To establish a number of pilot classes for the teaching of chemistry according to modern didactic criteria; to modernize the teaching of chemistry in secondary schools; and to emphasize the experimental approach.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Chemistry - Secondary level.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Lessons of Chemistry
2. Manual of Experiment, for the Lessons of Chemistry
3. Guide for teaching through experiment

X. USE OF PROJECT MATERIALS: 100 teachers are using complete program, and 50 others are using some of the materials. Schools where the materials are being used: Liceo Umberto, Napoli; Liceo Vittorio Veneto, Milano.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Italian

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: A new manual of experiments.

XIV. MATERIALS AVAILABLE FREE: None listed

XV. MATERIALS PURCHASABLE: The books indicated in IX at a nominal cost.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: National tests are carried on, which are classified by the national committee.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: The new teaching method is tried in pilot classes; experiments are extended in order to increase the number of teachers and of classes.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported

XIX. PLANS FOR THE FUTURE: To develop a new syllabus for Italian high schools.

I. PROJECT TITLE: Adaptation of BSCS High School Materials into Japanese

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Yosito Sinotô. October, 1962

III. PROJECT DIRECTOR: Yosito Sinoto

IV. PROJECT HEADQUARTERS ADDRESS: c/o Department of Biology, International Christian University, Mitaka, Tokyo, Japan

V. PROFESSIONAL STAFF: Yosito Sinotô, Chairman; Committee Members: Hisao Morikawa, Yujiro Nakajima, Isao Komatsu, Haruo Kinosita, Jukichi Shimoizumi, Kazutosi Nisizawa, Tomoo Miwa, Kazuhiko Nakayama, and Sherman A. Hoslett; William Utley, Consultant for Japan BSCS Committee, Biology Teacher, American S.I.J. and Con.

VI. PROJECT SUPPORT: The Asia Foundation Binational (Partial)

VII. SPECIFIC PURPOSES AND OBJECTIVES: Adaptation of BSCS materials into Japanese; acquaintance with the philosophy of BSCS; assist teacher training activities; and exchange of information on Biology Education between Japan and the U. S.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: High School, 10th grade biology

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. BSCS News Letter, Nos. 1 and 2
2. Adapted BSCS Blue Version text and laboratory instruction (to be published by July, 1966)

X. USE OF PROJECT MATERIALS: Approximately 100 teachers are considering using the complete program.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Japanese

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None at present. Possibly Blue Version Lab., etc., into English for U. S. schools in Japan.

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:
3. Adaptation of BSCS Yellow and Green Versions
4. BSCS Second Courses, Lab. Blocks

XIV. MATERIALS AVAILABLE FREE: BSCS News Letter, through BSCS Com. in Japan.

XV. MATERIALS PURCHASABLE: Adapted BSCS Blue Version, 5,000 yen (about $14.00).

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Feedback from 150 biology teachers; several seminars of biology teachers and university professors; comparison with currently used traditional materials; trial use of materials; examination for comprehension and retention; and requesting users of textbook to send reactions.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: One week institutes at Science Centers; training for Lab. activities; prefectural Science Centers, about 40 places. Briefing Sessions - 1st: August, 1963 at International Christian University, Introduction of BSCS; 2nd: July, 1966 at International Christian University, Method of Implementation of BSCS; Joint conference of Japan and U. S. biology teachers.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Japan-U. S. Joint Conference for BSCS Japanese Blue Version, July-August, 1965; teachers' training seminars; and about 20 one- or two-day sessions.

XIX. PLANS FOR THE FUTURE: Writing Conference for BSCS Japanese Yellow and Green Versions (January, 1967).

I. PROJECT TITLE: General Chemistry Course Plan based on Concepts of Energy and Structure

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Bun-ichi Tamamushi. April, 1965

III. PROJECT DIRECTOR: B. Tamamushi

IV. PROJECT HEADQUARTERS ADDRESS: Tokyo Joshi Daigaku (Tokyo Woman's Christian College), Zempukuji 2, Suginamiku, Tokyo, Japan.

V. PROFESSIONAL STAFF: H. Minato, Assist. Prof. International Christian University, Tokyo; S. Nagakura, Prof. University of Tokyo; K. Tamamru, Prof. University of Tokyo; R. Tamamushi, Dr. Institute for Chemical and Physical Research, Tokyo; K. Yoshioka, Prof. University of Tokyo.

VI. PROJECT SUPPORT:
A. Organizational sponsorships: None
B. Funding agency: Ministry of Education, Japan

VII. SPECIFIC PURPOSES AND OBJECTIVES: To improve traditional college chemistry courses and to explore the problem of how to introduce the fundamental concepts of energy and structure through quantum mechanics, statistical mechanics and thermodynamics into an introductory college chemistry course.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: General chemistry course plan for first and second year students of colleges and universities.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION: Mimeographical presentation of the outline of the new course plan.

X. USE OF PROJECT MATERIALS: In University of Tokyo and Gakushuin University, Tokyo.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Japanese

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Probably English.

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: None, at present.

XIV. MATERIALS AVAILABLE FREE: None described.

XV. MATERIALS PURCHASABLE: None described.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: No specific plans at present.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: No specific plans at present.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: The contents of the course and the teaching methods, including laboratory and demonstration, will be worked out during 1966-67.

I. PROJECT TITLE: Elementary Science Textbook Editing Project

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Ministry of Education. 1963

III. PROJECT DIRECTOR: Choi Yung Bok, Chief editor of Textbook Bureau

IV. PROJECT HEADQUARTERS ADDRESS: Bureau of Textbooks, Ministry of Education, Seoul, Korea

V. PROFESSIONAL STAFF: Chung Yun Tai, Professor of College of Education, Seoul National University; Su Yong Hwa, Chief of Astronomy section, National Meteorological Observatory; Lee Chung Chan, Principal of Kwang Chang Primary School; Chi Sam Kyu, Teacher of Attached Primary School, Choongang University; Pak Man Kyu, Professor of Catholic Medical College; Kang Han Soo, Principal of Bangsan Primary School; Lee Kil Sang, Professor of Science and Engineering College, Yunsei University; Son Chi Moo, Professor of Arts and Science College, Seoul National University; Choi Ki Chul, Professor of College of Education, Seoul National University; Im Beng Ki, Chung Choon Mo, Editors of Science Textbook, M.O.E.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Ministry of Education
B. Funding agency: Ministry of Education

VII. SPECIFIC PURPOSES AND OBJECTIVES: To edit the new Elementary Science Textbooks to conform to the curricular criteria which were established in 1963.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Elementary Science Textbooks, Grade 1 - Grade 6.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION: Elementary Science Textbook:
1. Grade 1 - 1
2. Grade 1 - 2
3. Grade 2 - 1
4. Grade 2 - 2
5. Grade 3 - 1
6. Grade 3 - 2
7. Grade 4 - 1
8. Grade 4 - 2
9. Grade 5 - 1
10. Grade 5 - 2*
11. Grade 6 - 1
12. Grade 6 - 2*

*will be printed by June 15, 1966

X. USE OF PROJECT MATERIALS: All teachers of primary schools in Korea (almost 80,000 persons) are using the complete program.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Korean

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Teachers' Guides for each level.

XIV. MATERIALS AVAILABLE FREE: None

XV. MATERIALS PURCHASABLE: Materials can be purchased from the Korean Textbook Company ($1 = 275 won).

1. 12 won
2. 13 won
3. 13 won
4. 13 won
5. 11 won
6. 12 won
7. 11 won
8. 12 won
9. 13 won
10. 12 won
11. 11 won
12. 13 won

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: The evaluation of textbooks has been planned by the education specialist of the Central Education Research Institute, Seoul, Korea. Under the Science Education Study Committee, the Elementary Science Education Study Committee will be organized in September, 1966. This study committee will take charge of evaluation of textbooks for the Curriculum Study Group of SESC.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Institutions for pre-service education - 13 junior normal colleges. At these colleges the courses of physics, chemistry, biology, and earth science are to be taken by students on the basis of 2 credits in one semester. Institutions for in-service education and summer or winter workshops for teachers supported by the Education Board of Cities and Provinces have been sponsored by SESC.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: The schedule of editing the textbooks is as follows:

1964 - Grade 1-1, 1-2 Grade 2-1, 2-2
1965 - Grade 3-1, 3-2 Grade 4-1, 4-2
1966 - Grade 5-1, 5-2 Grade 6-1, 6-2

XIX. PLANS FOR THE FUTURE: This project will continue its activity and evaluation with the publication of teachers' guides, and the revised editions of the textbooks.

I. PROJECT TITLE: New Science Curriculum Study Project

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Science Education Study Committee February, 1966

III. PROJECT DIRECTOR: Chung Yun Tai, Chairman of SESC

IV. PROJECT HEADQUARTERS ADDRESS: College of Education, Seoul National University, Seoul, Korea.

V. PROFESSIONAL STAFF: Chung Yun Tai, Professor of College of Education, Seoul National University; Choi Q Won, Professor of College of Arts & Science, Seoul National University; Kim Joon Min, Professor of College of Education, Seoul National University; Yoo Keng Loh, Professor of College of Education, Seoul National University; Kim Chi Yung, Professor of Yunsei University.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Science Education Study Committee
B. Funding agencies: Ministry of Education and USOM (expected)

VII. SPECIFIC PURPOSES AND OBJECTIVES: To study the new science curricula, such as PSSC, CHEMS, BSCS, ESCP, SMSG, and IPS; to adapt these new curricula to the Korean situation; to train science teachers in the methods of the new curricula.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Grades 1-6, Elementary Science; Grade 7, Life Science; Grade 8, Physical Science; Grade 9, Earth Science; Grade 10, Biology; Grade 11, Chemistry; Grade 12, Physics.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION: Report on the Science and Mathematics Curriculum Study of Secondary Schools.

X. USE OF PROJECT MATERIALS: 5 teachers at pilot course this year.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: PSSC Physics has been translated into Korean. CHEMS Chemistry will be translated into Korean by this year.

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None described

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: None described

XIV. MATERIALS AVAILABLE FREE: None described

XV. MATERIALS PURCHASABLE: None described

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: The new curricular materials mentioned above will be evaluated by the study members of this project with the cooperative study of education specialists. The Science Education Study Committee has set up a five-year plan for improvement of science education. Within this period study activities of new curriculum materials, adaptation to the Korean situation, training of science teachers and so on, will be accomplished. After the five-year plan we will edit the new science textbooks through grade 1 to grade 12. These textbooks will be evaluated by science teachers and education specialists.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: During the five years, the courses of PSSC physics, CHEMS chemistry, BSCS biology, ESCP earth science, SMSG mathematics and so on, will be offered to the students of each of the fields at the College of Education as professional courses. For the in-service training the Science Education Study Committee will set up the Institutes of PSSC, CHEMS, BSCS, ESCP, SMSG and the like under the sponsorship of Ministry of Education, USOM and some other agencies concerned.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: From February 28 to March 4, 1966, we held "Onyang Curriculum Conference" for secondary school science and mathematics. In the reports of this conference we recommended the following offering of courses to the Ministry of Education:

Grade 7 - Life Science
Grade 8 - Physical Science
Grade 9 - Earth Science
Grade 10 - Biology
Grade 11 - Chemistry
Grade 12 - Physics

The above-mentioned courses will be designed along the lines of the new movements, such as PSSC physics, CHEMS chemistry, and so on. These are characterized by modernizing the content and systematizing the presentation. Actually, the above courses are to be taken by students at school according to the following:

(a) Life science, Physical science, and Earth science are requisite courses for all students.

(b) Time allotments of these courses are 5 class hours per week for each course.
(c) Biology, Chemistry, and Physics are required courses for science majoring students; on the other hand, more than two courses are to be selected by other students.
(d) Unit allotment of these courses is 12-14 for each course (including experiments and practicing).
(e) Biology, Chemistry and Physics courses are to be flexible for grade.

XIX. PLANS FOR THE FUTURE: In general, during the first of the five years, activity will center on the collection and examination of the new materials. Improvement, adaptation and translation will follow. Pilot courses will be established to be followed by feedback courses, and finally a Korean version of the manuscript. Teacher training programs will continue throughout the five-year period.

I. PROJECT TITLE: Inter-American Program for Improvement of Science Teaching - Project 212 (Montevideo, Uruguay)

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Department of Scientific Affairs, Pan American Union. 1964

III. PROJECT DIRECTOR: Andrés Valeiras, Field Director

IV. PROJECT HEADQUARTERS ADDRESS: Unit of Education and Research, Department of Scientific Affairs, Pan American Union, Washington, D. C. 20006
Field Office: Casilla de Correo 2620, Distrito 2 - Pocitos, Montevideo, Uruguay.

V. PROFESSIONAL STAFF: Headquarters - Dept. of Scientific Affairs: J. D. Perkinson, Director; M. Alonso, Deputy Director; H. G. de Souza, Head, Unit of Education & Research; J. Sáiz del Rio, Program Specialist; R. S. Dorney, Program Specialist. Field Office: Ing. Andres Valeiras, Field Director; H. Merklen, Admin. Asst.; A. Guimarais, Physics; H. del Busto, Math; C. Andrade, Chemistry; M. Vegas, Biology.

VI. PROJECT SUPPORT:
A. Organizational sponsorships: Organization of American States - Program of Technical Cooperation and Government of Uruguay.
B. Funding agencies: Same as above.

VII. SPECIFIC PURPOSES AND OBJECTIVES: The basic objectives of Project 212 are the improvement of the teaching of the sciences and mathematics in the Member Countries of the OAS within the framework of the program of technical cooperation. To obtain these objectives the following activities are carried out: (a) short intensive and advanced courses for university professors - 3 months duration - in the specialties of mathematics, physics, chemistry and biology; (b) training courses for teachers of pedagogical institutes and science supervisors of the ministries of education - 3 months duration; (c) short training and information seminars for the groups mentioned above (held in conjunction with a); (d) the cooperation of the project with national courses that have the same objectives; (e) study of present curriculum used in secondary schools and teachers' colleges; (f) publication and translations of scientific monographs for the use of teachers; (g) information services by means of a news bulletin.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Mathematics, physics, chemistry and biology - university and secondary school levels.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Classnotes for use of course participants.
2. News bulletin published bimonthly.

X. USE OF PROJECT MATERIALS: 134 university teachers of mathematics, physics, chemistry from most member countries of the OAS are using the materials. A majority of these professors come from teacher training institutions.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Spanish

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:
3. Short scientific monographs and teachers' guides.
4. Collection of programs presently adopted in different countries of Latin America.
5. Translations into Spanish of materials suitable for use in Latin America.

XIV. MATERIALS AVAILABLE FREE: 2. News bulletin.

XV. MATERIALS PURCHASABLE: None described

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: None described

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: This is the most important aspect of the operation of Project 212. Through its courses the future leaders of teacher training activities in their countries can be trained and be made aware of the newest curriculum development efforts done in the U. S. and Europe.

The best students identified in the courses of Project 212 (of 3 months duration) will be given additional training by means of fellowships of 1 or 2 years' duration at universities and research institutions in their home countries or abroad.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT:

Course for Univ.Profs.	Dates	Place	No. of Participants	No. of countries
Chemistry	12/28/64- 2/26/65	Nat. Autonomous Univ.of Mexico	25	14
Physics	12/28/64- 2/26/65	Technical Inst. of Aeronautics, Brazil	17	9
Chemistry	6/14/65- 9/10/65	Univ. of the Oriental Rep. of Uruguay	18	11
Physics	9/6/65- 11/26/65	Univ. of the Oriental Rep. of Uruguay	20	9
Math	9/13/65- 12/10/65	Univ. of the Oriental Rep. of Uruguay	32	13
Math	1/10/66- 4/1/66	Same as above	22	12

XIX. PLANS FOR THE FUTURE: Four courses are planned for 1966:

1. Course for 25 university professors of chemistry--Sept.-Dec. 1966, Montevideo, Uruguay.
2. Course for 25 university professors of physics--Sept.-Dec. 1966, Recife, Brazil.
3. Course for 25 university professors of biology--Sept.-Dec. 1966, Lima, Peru.
4. Course for 25 university professors of mathematics--April-June 1967 (location not yet determined).

Additional activities are listed in the bimonthly news bulletin published by the project. Copies of the bulletin can be obtained by writing to: Heitor G. de Souza, Head, Unit of Education and Research, Department of Scientific Affairs, Pan American Union, Washington, D. C. 20006

I. PROJECT TITLE: East Pakistan Educational Equipment Development Bureau

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: Ford Foundation and E. Pakistan Directorate of Technical Education. April, 1965

III. PROJECT DIRECTOR: Waquar Ahmed

IV. PROJECT HEADQUARTERS ADDRESS: Education Directorate Building, Abdul Ghani Road, Dacca-2, E. Pakistan.

V. PROFESSIONAL STAFF: William Blase, Advisor

VI. PROJECT SUPPORT:
A. Organizational sponsorships: Ford Foundation; Department of Technical Education.
B. Funding agencies: Ford Foundation; Government of Pakistan.

VII. SPECIFIC PURPOSES AND OBJECTIVES: Reduce foreign exchange through design and manufacture of science equipment in the country; Improve equipment to meet local conditions and current syllabi; Teach maintenance procedures to teachers and institutions; Provide advisory service to science apparatus manufacturers.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Primary through Higher Secondary in High Schools and Vocational Schools.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. List of standard equipment
2. Fifteen prototypes and related drawings
3. Syllabi comparison reports

X. USE OF PROJECT MATERIALS: In Education Extension Center-Dacca, and local high schools.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Bengali

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Complete list of equipment for local manufacture. Survey of equipment presently in schools and future needs.

XIV. MATERIALS AVAILABLE FREE: Brochure; Curriculum comparison report.

XV. MATERIALS PURCHASABLE: None at this time.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Through local quality control and school experience. The project has only begun with the Pakistani personnel coming in June 1966.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: It is planned to build model classrooms for equipment evaluation and teacher training. Also, workshops are to be conducted in local schools and classes taught in local science workshops at the Extension Center.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported

XIX. PLANS FOR THE FUTURE: Propose to complete design and manufacture of prototypes by June, 1967. 100 schools will be part of the evaluation and will receive full sets of equipment. Specification books will be prepared listing equipment, description, manufacturer, repair facilities and price. A quality control center will be set up to test equipment from manufacturers before sending to schools.

I. PROJECT TITLE: Institute for the Advancement of Biology Teaching (Instituto para la Promoción de la Ensenanza de la Biología)

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: Eleven biologists of Peru. They work in 4 universities and in secondary schools. September, 1963

III. PROJECT DIRECTOR: Manuel Vegas, Universidad Agraria, Apartado 456, Lima, Peru

IV. PROJECT HEADQUARTERS ADDRESS: Universidad Cayetano Heredia, Apartado 5045, Lima, Peru

V. PROFESSIONAL STAFF: Manuel Vegas, Professor of Fisheries, Universidad Agraria; Raúl Ishiyama, Professor of General Biology, Universidad Cayetano Heredia; Lydia González, Prof. of Biology, Teachers School of La Cantuta; Estela de Maruenda, Aux. Prof. of Zoology, Universidad de San Marcos; Alberto Cazorla, Prof. of Biochemistry, Universidad Cayetano Heredia; Enrique Fernández, Prof. of Physiology, Universidad Cayetano Heredia; Ramiro Castro, Prof. of Pharmacology, Universidad Cayetano Heredia; César Morán, Prof. of Cytology, Universidad Agraria; Julia de Hidalgo, National Hygiene Institute; Santiago Ramos, Guadalupe School, Lima; Hernando Macedo, Checayani Laboratory, Puno; Augusto Vejarano, Aux. Prof. of Plant Physiology, Universidad Agraria.

VI. PROJECT SUPPORT:
A. Organizational sponsorships: Universidad Cayetano Heredia and Universidad Agraria.
B. Funding agencies: Instituto Peruano de Fomento Educativo, Lima; Ford Foundation; Ministry of Education, Lima.

VII. SPECIFIC PURPOSES AND OBJECTIVES: To modernize the biology knowledge of teachers and to promote the best teaching of biology, with modern materials, simple laboratory equipment, and intensive participation of students.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: College level, for teachers of biology in the secondary schools. In 1964 and 1965 summer courses: selected topics of Cytology, Biochemical Cytology, Animal Physiology, Ecology, Evolution and Genetics, with some 30 laboratory experiences. In 1966 summer course: Green Version of the BSCS.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. 30 Guides for Laboratory Experiments
2. 1 Kit for Laboratory Experiments

X. USE OF PROJECT MATERIALS: 92 teachers are using the complete program.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Spanish

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None described

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: None described

XIV. MATERIALS AVAILABLE FREE: None described

XV. MATERIALS PURCHASABLE: None described

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Written information from teachers, about the usefulness of the materials and suggestions to improve them, and personal visits to teachers, observations of the work, and discussion about success and difficulties.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: None described

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Latin American Conference of Biology Teachers to discuss the problems involved in the use of BSCS. March, 1966. The recommendations are in press to have a pamphlet directing the teachers in the use of BSCS materials and methods.

XIX. PLANS FOR THE FUTURE:
1. New summer institutes
2. Seminars about modern biology teaching, in various cities of the country
3. Translations of some paperbacks to use for complementary lectures
4. Publication of own works in special subjects.

I. PROJECT TITLE: BPS-Peace Corps Project on Elementary Science and Elementary Mathematics Curriculum Development

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Bureau of Public Schools. May, 1965

III. PROJECT DIRECTOR: Aurelio Juele

IV. PROJECT HEADQUARTERS ADDRESS: Science Education Section, Special Subjects & Service Division, Bureau of Public Schools, Manila, Philippines.

V. PROFESSIONAL STAFF: Dalmacio Martin, Chief, SSSD; Marcela B. Garcia, Asst. Chief, SSSD; Angela Villavert, General Education Supervisor II; Efrain Abracia, Curriculum Coordinator I; Roberto Alves, Mathematics Consultant, Peace Corps/Philippines; Richard Smith, Science Consultant, Peace Corps/Philippines.

VI. PROJECT SUPPORT: Bureau of Public Schools; Peace Corps/Philippines.

VII. SPECIFIC PURPOSES AND OBJECTIVES: To upgrade and update the teaching of science and mathematics in the elementary schools; and to furnish the elementary school teacher with updated curriculum guides in both elementary science and elementary mathematics.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Elementary Mathematics, Grades I-VI; Elementary Science, Grades III-VI.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Elementary Mathematics - A Curriculum Guide for Teachers' Use in Grades I-IV, Volumes I and II.

X. USE OF PROJECT MATERIALS: 170 teachers are trying out the newly developed guide, and at least 200 are using the Math Guide as enrichment material. Specific schools where the guide is being used include: E. de Los Santos Elementary School, Malabon, Rizal; Cebu Normal Laboratory School, Cebu City; Malolos Elementary School, Malolos, Bulacan; Sagada Elementary School, Sagada, Mountain Province.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:
2. Elementary Mathematics for Grades V-VI
3. Elementary Science Curriculum Guides for Grades III-VI

XIV. MATERIALS AVAILABLE FREE:
1. Elementary Math Guide for Grs. I-IV - out of print, will be revised on May 30-June 25, 1966.

XV. MATERIALS PURCHASABLE: None

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Teachers who have tried out the guide sent in feedback summaries on their usage, which are compiled for future discussion. Portions of the feedback summary were discussed in a pre-workshop conference. After a thorough evaluation, revision of its component units follows. Individual teachers administer their own tests after finishing each unit. Feedback reports suggested that some changes on the material are necessary. Revision will be undertaken this summer.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Teachers involved in the try-out were given in-service training on the new approaches, basic topics and fundamental concepts of modern math. Modern math courses are being offered in the government normal schools.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: In the summer of 1965, the elementary mathematics curriculum guide for Grades I-IV was developed. This guide was tried out by selected teachers in the school year 1965-1966 in 170 classes in 16 school divisions and one normal school. Reports on the use of the units in the guide were sent by the teachers to the General Office, BPS. This feedback will be used as basis for the revision of the guide in the summer of 1966.

XIX. PLANS FOR THE FUTURE: The revised Guide for Grades I-IV will be used for a period of approximately five years before another revision is done. It will be sent to the field for the use of teachers who have been given training in the use of them or have some background in modern mathematics. The math guide for Grades V and VI will be developed in the summer of 1966, tried out in the school year 1966-1967 by selected teachers and probably revised in 1967 summer. Reports from try-out classes (those that used the math guide in Gr. IV) shall be used as basis for the revision.

I. PROJECT TITLE: NSDB-BPS-PCV-U. P. Secondary School Science & Mathematics Teaching Improvement Project (Project 2.84)

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Bureau of Public Schools, Manila, Philippines. May, 1963

III. PROJECT DIRECTOR: Licería B. Soriano

IV. PROJECT HEADQUARTERS ADDRESS: Science Education Section, Special Subjects & Services Division, Bureau of Public Schools, Manila, Philippines.

V. PROFESSIONAL STAFF: Dalmacio Martin, Chief, SSSD; Marcela B. Garcia, Asst. Chief, SSSD; Aurelio Juele, Chief, Science Education Section; Carolina Perez, Curriculum Coordinator; Roberto Alves, Math Consultant, Peace Corps/Philippines; Richard Smith, Science Consultant, Peace Corps/Philippines.

VI. PROJECT SUPPORT:
A. Organizational sponsorships: Bureau of Public Schools; University of the Philippines; Peace Corps/Philippines.
B. Funding agency: National Science Development Board

VII. SPECIFIC PURPOSES AND OBJECTIVES: To upgrade science and mathematics instruction in secondary schools; and to help in the program for the development, adaptation, and introduction in secondary schools of new science and mathematics curriculum materials.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: General Science, first year and second year; Secondary Mathematics, first year, second year, and third year.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. A Tentative Curriculum Guide - General Science I for Philippine High Schools (A teacher's guide in the teaching of first year General Science).
2. A Tentative Curriculum Guide - General Science II for Philippine High Schools (A teacher's guide in the teaching of second year General Science).
3. Experimental Curriculum Guide in Mathematics I (A teacher's guide in the teaching of first year mathematics).
4. Experimental Curriculum Guide in Math II (A

teacher's guide in the teaching of general mathematics).

X. USE OF PROJECT MATERIALS: The number of teachers using the guides are as follows: Item No. 1 above is being used by 37, item 2 by 26, item 3 by 50 and item 4 by 19. Specific schools where the guides are being used include: Pio Duran Memorial High; Antique High; Tabaco High; Bacolod City High; Baguio City High; Bohol High; Valencia High; Basilan City High; Arellano Memorial High; Batanes High; San Miguel High; Caloocan City High; Jose Panganiban High; Camarines Norte High; Camarines Sur High; Partido High; Nabua High; Cebu South High; Dagupan City High; Davao City High; Iligan City High; Pedro Guevarra Memorial High; La Union High; Misamis Occidental High; Nueva Ecija South High; San Francisco High; Morong High; Looc High; Tarlac High; Samar High; Zamboanga City High.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:
5. Tentative Curriculum Guide in Math III (A teacher's guide in the teaching of Algebra).

XIV. MATERIALS AVAILABLE FREE: All materials produced are given free (on loan basis) to public school teachers only.

XV. MATERIALS PURCHASABLE: None

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Teachers using the materials are given questionnaires to complete after finishing each unit of the guide they are using. This feedback information is then analyzed and used as a basis for revision of the guide.

Items 1 and 2 were developed in 1963 and tried out in eleven high schools during the school year 1963-1964. They were first revised during the summer of 1964 by a group of about ten Filipino teachers and about ten Peace Corps volunteers. The revised materials were then used in about 15 high schools during the school year 1964-1965. These materials underwent a second revision during the summer of 1965. This school year these materials are being used in some 31 high schools.

Item 3 was developed in 1964 and tried out in eleven high schools during the school year 1964-1965. It was first revised in the summer of 1965. It is now being used in some 31 high schools.

Item 4 was developed in 1965 and was tried out in 17 high schools this school year 1965-1966. It will undergo revision by the summer of 1967.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Summer institutes for General Science teachers and Secondary Mathematics teachers will be held to enrich the teachers' proficiency in the earth sciences and in modern mathematics.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Development of materials and teacher training during summer session, and testing of materials during the school year.

XIX. PLANS FOR THE FUTURE: Revision of material 4 (IX), and development of Curriculum Guide in Geometry.

I. PROJECT TITLE: Science Teaching Center, University of the Philippines

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: Enrique Virata; Augusto Tenmatay; Alfredo Morales; Dolores Hernandez. November, 1964

III. PROJECT DIRECTOR: Dolores F. Hernandez

IV. PROJECT HEADQUARTERS ADDRESS: Science Teaching Center, College of Education, University of the Philippines, Diliman, Quezon City, Philippines.

V. PROFESSIONAL STAFF: Robert Ward, Consultant; Consuelo V. Asis, Chairman Biology Writing Group; Pilar da Silva, Chairman Chemistry Writing Group; Porfirio Jesuitas, Chairman Elementary & Gen. Science Writing Group; Josefina Fonacier, Chairman Mathematics Writing Group; Segundo Roxas, Chairman Physics Writing Group.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: University of the Philippines
B. Funding agencies: Ford Foundation and University of the Philippines

VII. SPECIFIC PURPOSES AND OBJECTIVES: To produce curriculum materials for elementary and secondary school math and science designed for use in Philippine schools, and to serve as a resource center for science and math teachers, and school administrators, making available for their use a science education library and a collection of audio-visual aids.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Math, G I - VI; Math High School, I-IV; High School General Science, I and II; High School Physics; High School Chemistry; High School Biology - supplementary materials for use by teachers.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION: None. (However, a previous project under the direction of Dr. Hernandez produced an adaptation of the Green (Ecology) Version of BSCS for use in the Philippines. This was supported by the Asia Foundation, The Philippine National Science Development Board, the Biological Science Curriculum Project, and the University of the Philippines. The adapted course was tested by

12 teachers with 1,600 students. It has been published commercially (see XV below).

X. USE OF PROJECT MATERIALS: None (see IX above).

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: A teacher's guide and student text are being developed for each of the subjects mentioned in VIII except biology. In high school physics there will be a separate student laboratory manual. In chemistry the instructions for laboratory work will be included in the text. In biology three books are being produced: Common Plants of the Philippines, Common Animals of the Philippines, Genetics for Teachers.

XIV. MATERIALS AVAILABLE FREE: Science Teaching Center, March, 1966 (a descriptive brochure) available upon request to the director.

XV. MATERIALS PURCHASABLE: None from present project. From the previous project mentioned in IX there is now available: Biology for Philippine High Schools: The Relationships of Living Things. Text - ₱16.90 ($4.56); Laboratory Manual - ₱9.90 ($2.54); Teacher's Guide - ₱6.00 ($1.54). These are available from: Alemar's - 769 Rizal Ave., Manila, Philippines.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Starting in the academic year 1967-68, a trial edition of each book will be used in about 20 classes for a two-year period. This will be carried out in selected high schools around the country. The evaluation program has yet to be designed, but it will include the obtaining of teachers' responses, the observing of classes by people from S.T.C., and the testing of the children using the materials designed by the project.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: All teachers involved in the evaluation program will be given special training in a summer institute. There will also be regular meetings for the teachers involved during the year.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: The grant for the project was made in November 1964, and most of the full time professional staff began in January 1965. Since then the various books have been planned, writing groups formed, and about two thirds of the materials are in at least first draft.

XIX. PLANS FOR THE FUTURE: It is hoped that most, if not all, of the materials will be completed by June 1967 when the evaluation program will begin (see XVI). During the following two or three years, it is planned that the materials will be revised on the basis of what is learned from the evaluation. It is believed that support will be available from Philippine sources to make the Science Teaching Center a permanent organization at the University.

I. PROJECT TITLE: Modernization of the Teaching of Mathematics in Secondary Schools

II. PRINCIPAL ORIGINATORS: O.E.C.D. and the National Ministry of Education, of Portugal

III. PROJECT DIRECTOR: Jose Sebastião e Silva

IV. PROJECT HEADQUARTERS ADDRESS: Avenida Infante Santo, 68, F°., E - Lisboa 3, Portugal

V. PROFESSIONAL STAFF: J. Sebastiao e. Silva, Professor of Mathematics, University of Lisbon; J. Furtado Leote, A. Augusto Lopes, M. Augusto da Silva, Teachers of Mathematics; J. Carneire de Silva, Inspector of Mathematics.

VI. PROJECT SUPPORT: O.E.C.D. and the National Ministry of Education, of Portugal.

VII. SPECIFIC PURPOSES AND OBJECTIVES: Introducing modern mathematics and new methods of mathematical education in the last two years of secondary schools (scientific section).

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Mathematical logis; Theory of sets, relations and functions, in connection with analytic geometry; General algebraic structures: semigroups, groups, rings, fields and boolean algebras; Introduction to probability theory and statistics. Vectors, complex numbers, geometric transformations and linear mappings; Introduction to differential and integral calculus.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Compendium of Mathematics I (pilot text)
2. Guide for Utilization of Compendium of Mathematics I
3. Compendium of Mathematics II

X. USE OF PROJECT MATERIALS: Twenty teachers are using the complete program. Several high schools in Lisbon, Oporto, Coimbra, Oeiras and Leirra are teaching the course.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Portuguese

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: 4. Guide for Utilization of Compendium of Mathematics II.

XIV. MATERIALS AVAILABLE FREE: None described

XV. MATERIALS PURCHASABLE: None described

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Ordinary testing procedures. Materials are being used quite successfully both by teachers and pupils.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Summer courses during vacations, near Lisbon, and T.V. lectures on selected topics in modern mathematics and new teaching methods.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: Continuation of the preceding project along the same lines.

I. PROJECT TITLE: The Nordic Committee for the Modernizing of School Mathematics

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: The Nordic Commission of Culture. July, 1960

III. PROJECT DIRECTOR: Lennart Sandgren

IV. PROJECT HEADQUARTERS ADDRESS: Ecklesiastikdepartementets kommittelokaler, Fack, Stockholm 5, Sweden

V. PROFESSIONAL STAFF: Matts Håstad, Secretary; Gertrude Wistedt, Assistant.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Formerly OECD, Paris
B. Funding agencies: The Governments in Denmark, Finland, Norway and Sweden.

VII. SPECIFIC PURPOSES AND OBJECTIVES: To renew school mathematics in all school stages. Obsolete subjects are deleted. The concept formation is stressed; sets, elementary logic, functions, vectors, and basic laws of arithmetic are emphasized.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Texts for the whole school are published (Grades 1-12). For Grades 11-12 special texts on statistics and probability and differential equations are published.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION: 34 experimental textbooks for all school stages, as follows:
1. 6 for grades 1-3
2. 9 for grades 4-6 (a translation from School Mathematics Study Group)
3. 10 for grades 10-12
4. 9 for grades 7-9

X. USE OF PROJECT MATERIALS: 180 teachers in grades 1-9, and 150 teachers in grades 10-12 are using the complete program, and 30 teachers are using portions of it.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Danish (some); Norwegian (some); Finnish (some); Swedish (some).

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None, so far.

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: No more experimental texts will be published. The Committee is now working on the final report to be published during the early part of 1967.

XIV. MATERIALS AVAILABLE FREE: A short report in English which details the contents of texts and describes the type of student for which the program was designed.

XV. MATERIALS PURCHASABLE: The material under IX can be purchased. Under special conditions it can be supplied free. A price list follows. Write to: The Nordic Committee for the Modernizing of School Mathematics, "Nordiska kommittén för modernisering av matematikundervisningen, Ecklesiastikdepartementets kommittelokaler, Fack, Stockholm 5, Sweden".

Text	Designation	Price (sv.kr)
Mathematics		
Grade 1	M 1 I - II	5:-
Grade 2	M 2	4:-
Grade 3	M 3	4:-
Grade 4	M 4 I; M 4 II; M 4 III	3:50 ea.
Grade 5	M 5 I; M 5 II; M 5 III	3:50 ea.
Grade 6	M 6 I; M 6 II; M 6 III	3:50 ea.
Algebra	A 7-9 I; A 7-9 II;	
Grades 7-9	A 7-9 III 2S; A 7-9 III 3S;	
	A 7-9 IV 1S; A 7-9 IV 2S;	
	A 7-9 V 1S; A 7-9 V 2S;	
	A 7-9 I 3D; A 7-9 II 3D	5:-- ea.
Geometry	G 7-9 I; NG 7-9 I;	
Grades 7-9	NG 7-9 II	5:-- ea.
Algebra	A 10-12 I; A 10-12 II	6:-- ea.
Grades 10-12	A 10-12 III	1:--
Geometry	G 10-12 I	6:--
Grades 10-12	G 10-12 II	4:--
	G 10-12 II-III; G 10-12 III	6:-- ea.
Calculus	F 11-12 I	7:--
Grades 11-12	F 11-12 II	7:--
Probability and Statistics		
Grades 10-12	S 10-12	7:--
Differential Equations		
Grades 11-12	D 11-12	5:--

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Materials are taught in the schools on an experimental basis. Teachers then work out reports of their experiences. Some short tests on the common parts of experimental and traditional program have been set.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Teacher preparation will be handled by the governments in the respective countries when the new curricula are introduced.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: The experimental teaching has continued. Some tests have been set. The Committee is now working on its final report.

XIX. PLANS FOR THE FUTURE: The experimental teaching will continue for some years. The final report will be published during the early part of 1967.

I. PROJECT TITLE: Alternative Syllabuses in Physics and Chemistry for Secondary Schools

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Scottish Education Department. 1962

III. PROJECT DIRECTOR: None listed

IV. PROJECT HEADQUARTERS ADDRESS: St. Andrew's House, Edinburgh, 1, Scotland

V. PROFESSIONAL STAFF: A. J. Mee and W. R. Ritchie, H. M. Inspectors of Schools

VI. PROJECT SUPPORT: Scottish Education Department

VII. SPECIFIC PURPOSES AND OBJECTIVES: To modernize science teaching syllabuses in Scottish Secondary Schools; to rationalize the subject matter, and to improve teaching method.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Physics and Chemistry, from ages 12 to 17; to Ordinary and Higher Grade of the Scottish Certificate of Education.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Syllabuses and Circulars 490 and 512, published by Scottish Education Department.
2. Memoranda for teachers issued by Scottish Education Department.
3. 16mm sound films - "Physics for All", "Introducing Electrovalency"; 8mm cassettes - First year physics. Made by Educational Films of Scotland.
4. Memoranda on testing issued by Scottish Education Department.
5. Report on examinations based on the new syllabuses, 1965. Scottish Certificate of Education Examination Board.
6. Lists of recommended apparatus, by Advisory Committee on Physics.
7. Bulletins on equipment, by Scottish Schools Science Equipment Research Centre.
8. Bulletins issued by local associations of teachers.

X. USE OF PROJECT MATERIALS: All secondary schools in Scotland have now introduced the new syllabuses.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:
9. Further memoranda for teachers on physics and chemistry.
10. An additional film.

XIV. MATERIALS AVAILABLE FREE:
2. Scottish Education Department, St. Andrew's House, Edinburgh, 1.
4. Scottish Education Department, St. Andrew's House, Edinburgh, 1.
5. Scottish Certificate of Education Examination Board, Saughton, Edinburgh, 11.
7. Scottish Schools Science Equipment Research Centre, 103 Broughton Street, Edinburgh, 1.

XV. MATERIALS PURCHASABLE:
1. Her Majesty's Stationery Office, Circular 490, 3/6d, Circular 512, 2/6d.
3. Scottish Film Council, 16/17 Woodside Terrace, Glasgow, C. 3.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS. Evaluation has been completed.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: In-service training courses are offered at Moray House, Jordanhill, Dundee and Aberdeen Colleges of Education. These cover method and content. Lectures are given at local science associations.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: A Working Party is preparing a science syllabus for pupils not aiming at the Scottish Certificate of Education. This is now being tried out in 60 pilot schools and the Report is expected in 1967.

I. PROJECT TITLE: Structural Materials for Teaching Math to Infants; "New Ideas" in Mathematics for Children (age 12-15 years)

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: None described

III. PROJECT DIRECTOR: Sair Ali Shah

IV. PROJECT HEADQUARTERS ADDRESS: Institute of Education, University of the West Indies, St. Augustine, Trinidad, W. I.

V. PROFESSIONAL STAFF: Sair Ali Shah, Lecturer, Institute of Education

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Institute of Education, University of the West Indies.
B. Funding agencies: Institute of Education, U.W.I.

VII. SPECIFIC PURPOSES AND OBJECTIVES: To observe children's (infants') reactions to certain structural material (cuisenaire rods) in learning mathematics; to develop content in mathematics, so that there is continuity from infant school to high school; and to observe the reaction of children (12-15 years) to certain "new ideas" in mathematics.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Use of Cuisenaire Rods for Teaching Mathematics to Children. Topics: Four Operations (Addition, Subtraction, Multiplication, Division), Inequalities, Sentences, Numbers; "New Ideas" for Age 12-15. Topic: Numbers, Operations, Measurement, Sets, Matrices, Geometry, Trigonometry, Statistics.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. "Principles of Teaching Mathematics" published by Longmans.
2. "Ideas in Mathematics" - Introduction, Numbers, Operations, Measurements (each in separate booklet); Teacher Education included.

X. USE OF PROJECT MATERIALS: 2,000 teachers are using the complete program, and 3,000 more are using some of the materials. Specific schools where the material is being used: in Trinidad and Tobago - Primary schools (post primary classes: age 12-15 years);

secondary schools: St. Joseph Convent, Trinity College, Couva Secondary.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:
3. Variation - A Fundamental Idea
4. The Algebra of Numbers, Sets, Matrices

XIV. MATERIALS AVAILABLE FREE: For item 2 above, write to Sair Ali Shah, Institute of Education, U.W.I., St. Augustine, Trinidad.

XV. MATERIALS PURCHASABLE: For item 1 above, write to Longmans and Green and Co., Ltd., Grosvenor Square, London, W. 1, United Kingdom. Price: $1.00 (U.S.).

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Materials are being evaluated by "controlled" experiment comparing with a group, using traditional mathematics, and by attitudes toward mathematics determined by questionnaires and interviews. Testing occurs at the beginning and progress stages with both "control" and experiment groups.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Courses: Summer courses; In-service Courses; Through booklets; Content: Numbers, Sets, Matrices; Methodology: Psychological Bases of Teaching Mathematics; Place: Institute of Education - Trinidad, Barbados, St. Lucia, St. Kitts. Work to be extended to other West Indian Islands.

XVIII. PROJECT ACTIVITIES SINCE 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: Courses on School District Basis in Islands for teachers - Content and Methodology (Psychological Bases); progress report on Infants School Project; and extension of "Ideas in Mathematics" to age group 12-15 years. Here more children will be used for experimenting.

I. PROJECT TITLE: Mobile Units for Science Teaching

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Executive Committee. Mobile units were prepared in cooperation with OECD during the 1963-64 academic year.

III. PROJECT DIRECTOR: Rauf Nasuhoğlu, Chairman of the Committee.

IV. PROJECT HEADQUARTERS ADDRESS: General Directorate of Educational Aids and Technical Cooperation, Ministry of Education, Ankara, Turkey.

V. PROFESSIONAL STAFF: Rauf Nasuhoglu, Dean of the Faculty of Sciences, Ankara University; Bahattin Ornekol, Vice Chairman Physics Department, Gazi Teacher College, Ankara; Mehmet Bertan, Science Teacher, and Division Director, of the General Directorate of Educational Aids and Technical Cooperation, Ministry of Education; and two trained science teachers are in charge of guiding the teachers in the pilot project area.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Ministry of Education, Turkey.
B. Funding agencies: Ministry of Education, Turkey Committee of Scientific and Technical Personnel, OECD.

VII. SPECIFIC PURPOSES AND OBJECTIVES: In-service training for science teachers; and to make use of science materials in more schools, especially in areas where such materials are not readily available or nonexistent.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Physics - Grade Level: Junior High School and High School.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Physics materials provided by OECD and the Ministry of Education from abroad.
2. Materials used in this project are as follows: Five Experiment Boxes; Modern physics materials supplied by OECD from different firms and countries; Supplemental materials from the center for instructional aids production of Turkey; Some simple physics materials produced by students using UNESCO publica-

tions for guidance.

X. USE OF PROJECT MATERIALS: 42 science teachers in the pilot project area in the Province of Elazig, eastern part of Turkdy, are using the complete program. The materials are being used in 14 secondary schools enrolling 3,652 students. About 90% of the classes were provided with experiments this year as against virtually none in previous years.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Materials were originally in German, French and English. They were translated into Turkish and distributed to the teachers in the pilot project area.

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: None listed

XIV. MATERIALS AVAILABLE FREE: None

XV. MATERIALS PURCHASABLE: These materials are being supplied to schools by the government of Turkey, and the departments concerned pay the cost. Presently materials developed by the Center in Turkey are only being made for schools in Turkey and are not being sold abroad.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Materials are being evaluated by the Executive Committee. The project will continue next year in the same area, and if it continues to be useful it will be expanded to the other areas.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: In-service training courses are being held every year for science teachers in various parts of Turkey. Duration of the courses varies from two to three weeks.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: Project will be expanded into other areas. At present, indications are that it will be more profitable if additional funds are available. When the pilot project is over the State Planning Agency is planning to make it a national project.

SYNOPSES

Many worthy curriculum efforts around the world have undoubtedly gone unreported due to various delays, publishing deadlines, or lack of contact. Still others are only in the preliminary stages of development. The following synopses, drawn from clearinghouse reports and various other sources, are included as a sampling of such activities.

I. The Division of Science Teaching of the United Nations Educational, Scientific and Cultural Organization (UNESCO), under the directorship of Dr. Albert V. Baez, seeks to promote national and regional efforts of science curriculum reform through a variety of catalytic processes. During 1963 and 1964 a Pilot Project in Physics Teaching was carried out at Sao Paulo in cooperation with the Brazilian Institute for Education, Science and Culture. The project developed programmed instruction materials and kits of low-cost laboratory apparatus for individualized learning. Teachers' manuals and films were also prepared. UNESCO plans to produce further publications and science teaching materials including comparative surveys on the teaching of mathematics, chemistry, physics, and biology at the university level; yearbooks in each discipline and on the interdisciplinary aspects of science teaching entitled "New Trends in Science Teaching"; and a survey of science teaching films. Prototype materials will include those produced within the framework of the UNESCO Pilot Projects in chemistry and biology, patterned after the existing materials in physics, and a series of short inexpensive teaching films in physics produced in response to a UNESCO survey on the special needs in this subject.

A secondary school mathematics guide, a biology teaching guide, and a survey on the introductory teaching of mathematics, are also UNESCO productions scheduled for the years ahead. For French-speaking Africa, a special set of prototype programmed instruction materials in the field of mathematics will be produced.

In addition, UNESCO has created a new Science Teaching Briefing Center at UNESCO House. Here the science educator will find the up-to-date materials he will need to prepare himself or other specialists in developing countries. Included are new project materials, textbooks, periodicals and books on methods of pedagogy and educational planning.

Further information on UNESCO projects may be obtained from Dr. Baez of the Science Teaching Division, UNESCO, Place de Fontenoy, Paris 7^{e}, France.

II. The Organization for Economic Cooperation and Development (OECD) sponsored a series of school science seminars in the early 1960's. International experts gathered to discuss the current trends and problems in science and mathematics education with the basic objective of stimulating science curriculum reform in the member countries. The result of these seminars has been published in a series on "New Thinking in School Science". These meetings undoubtedly acted as a catalytic agent of curriculum improvement throughout the various member countries and, therefore, the proceedings are still of relevance and interest to science educators. While OECD has discontinued its work on school curricula reform, additional works in educational areas continue to be published.

Titles of interest include: New Thinking in School Mathematics; School Mathematics in OEEC Countries; Synopses for Modern Secondary Mathematics; Mathematics To-Day: A Guide for Teachers; New Thinking in School Chemistry; Chemistry To-Day: A Guide for Teachers; School Chemistry: Trends in Reform - Selected Topics; A Modern Approach to School Physics; Physics To-Day: A Guide for Teachers; New Thinking in School Biology; Biology To-Day - Its Role in Education; Mathematics for Engineers and Physicists; Engineering Education in the Computer Age; Mathematics and Engineering Applications; and, Mathematical Education of Engineers.

In the United States, contact OECD Publications Center, Suite 1305, 1750 Pennsylvania Avenue, N. W., Washington, D. C. 20006. In France, write OECD Publications Office, 2, rue Andre - Pascal, Paris (16^{e}). A complete list of distributors is included in most OECD publications.

III. The Conference of Scientific Education Study in Osaka, Japan, is currently working on reformation and modernization of both elementary and secondary science curricula. To date, about thirty booklets and pamphlets have been issued in Japanese and textbooks are expected in the future. For further information, contact Dr. Kozo Imahori, Department of Biology, College of General Education, University of Osaka, Toyonaka-shi, Osaka, Japan.

IV. Faculty at the University of Tokyo are developing a standard curriculum to be used in basic courses of engineering education at second and third year levels of college. Textbooks will be prepared in a year or two. Preliminary reports in Japanese or English are available from Professor T. Mukaibo, Head, Department of Industrial Chemistry, Faculty of Engineering, University of Tokyo, Tokyo, Japan.

V. The Alberta Elementary Science Project is in the early stages of developing a blueprint for the elementary science program based on evaluation of different experimental elementary science programs currently being developed in the United States. Inservice work has started and the first round of teacher and pupil reactions have been received from the experimental centers. Additional information may be obtained from Professor Neil M. Purvis, Department of Elementary Education, University of Alberta, Edmonton, Alberta, Canada.

VI. A new biology program similar to BSCS but aimed specifically at Grade XIII of Canadian high schools and at terminal biology and arts students in colleges, has been launched by Mr. Fred M. Speed of the University of Toronto, Toronto, Ontario, Canada. Texts, guides, and manuals are currently available and work on models and apparatus is in progress.

VII. The University of Chicago Survey of Recent East European Literature in School and College Mathematics and the MIT Press (50 Ames Street, Cambridge, Mass. 02142) will begin to publish in early 1967 a series of authorized translations of booklets written for use in schools for mathematically talented Soviet pupils. Professor I. M. Gelfand of Moscow University is the editor of the series which is developed to give the student a deeper understanding of mathematics and its foundations, to involve him in independent work, and to stimulate his mathematical creativity.

VIII. Professor Burton W. Jones of the Department of Mathematics at the University of Colorado, Boulder, Colo. 80302, has prepared a list of mathematics works available in Spanish.

IX. Recently a new Institute of the Pedagogy of Sciences under the directorship of Dr. K. Hecht, has been established at the University of Kiel, Gebaude 34, 23 Kiel, Germany. The basic purpose of the institute is to carry on scientific research in the field of science teaching and education with particular emphasis on bridging the gap between the natural sciences and relevant pedagogical, psychological, and sociological aspects. Concerned with science education at all school levels and for all types of students, the institute hopes to conduct research and to initiate, stimulate and advise university courses.

X. The Norwegian-Swedish Physics Project which started in the autumn of 1962 has now produced four textbooks for a physics course for general and technical upper secondary schools. A fifth and final text is now in preparation. The course itself is founded on PSSC Physics.

The Scandinavian Chemistry Committee is a Norwegian-Swedish pilot project working on a reform of the teaching of chemistry. The committee began working in 1964 and is now trying out its text material in 13 Swedish and 10 Norwegian schools.

Further information on these two projects is available from Ingrid Karlström, forste byrasekreterare Kungl Skolöverstyrelsen, Fack, Stockholm 22, Sweden.

XI. A research project has recently been initiated within the framework of the Departments of Education and Physics at Tel-Aviv University. The major purpose of this project is the study of newly developed elementary (K-8) science materials from U. S. projects with a view to examining their applicability in Israel. The project is supported by the Israel Ministry of Education and Culture and is headed by Mr. Feuchtwanger, Physics Department, Tel-Aviv University, Ramat-Aviv, Tel-Aviv, Israel.

XII. The Association for Science Education (ASE) of Britain has been concerned with reform of the science curriculum in elementary and secondary schools at "O" and "A" levels. From 1961 to the present, variour policy statements and proposed new syllabuses have been developed. Information concerning ASE projects can be obtained from Mr. E. W. Tapper, Secretary, Association for Science Education, 52 Bateman Street, Cambridge, England.

XIII. In addition to the Nuffield Foundation projects described elsewhere in this report, the Foundation has sponsored several other projects that have as their basis science as a method of inquiry. "O" level biology and chemistry projects have been completed with publication of their materials scheduled for 1966. The "A" level projects for these same subjects are underway as is a physical sciences "A" level course. Publication of "A" level materials will probably not take place until sometime in 1967 or 1968. Information on these projects can be obtained from Mr. J. Maddox, Project Coordinator, Nuffield Foundation Science Teaching Project, Mary Ward House, 5-7 Tavistock Place, London, W. C. 1, England.

XIV. The Midlands Mathematics Project (MMP) has also developed a program modernizing the content and teaching of mathematics in English schools. Annual reports have been available since 1961 and the first students' texts and allied materials have recently been published by Harrap. Mr. Cyril Hope, Director MMP, City of Worcester Training College, Henwick Grove, Worcester, England, can provide additional details.

XV. The School Council for Curriculum Reform is coordinating the work of the various English mathematics and science projects. In addition, they have worked closely with Nuffield teams by providing field services, advice, and evaluation. Other aspects of their functions along with materials on curriculum reforms, are available in publication form from the Schools Council, 38 Belgrave Square, London, S.W. 1, England.

XVI. The National Educational Institute of Kinshasa in the Democratic Republic of the Congo is working on the improvement of science education in that country and will participate in a pilot project of biology (sponsored by UNESCO) beginning in the fall of 1966. Professor P. Viard of that institute is the person to contact for further information.

XVII. A joint conference of the Mathematics Curriculum Study (Cambridge Conference on School Mathematics) and the School Mathematics Project, Southampton, England, is scheduled for September 9 - 12, 1966 in England. The CCSM and the SMP will each invite about twelve mathematicians to this conference which will be concerned with mathematics education. The organizer of the conference is Bryan Thwaites, Director of the SMP.

I. PROJECT TITLE: AAAS Commission on Science Education

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: American Association for the Advancement of Science, 1515 Massachusetts Avenue, N. W., Washington, D.C. 20005. 1962

III. PROJECT DIRECTORS: John R. Mayor and Arthur H. Livermore

IV. PROJECT HEADQUARTERS ADDRESS: American Association for the Advancement of Science, 1515 Massachusetts Avenue, N. W., Washington, D. C. 20005

V. PROFESSIONAL STAFF: Edwin B. Kurtz, Jr., Assistant Director in Charge of Teacher Education; and Henry H. Walbesser, Assistant Director in Charge of Evaluation

VI. PROJECT SUPPORT:
A. Organizational sponsorship: American Association for the Advancement of Science
B. Funding agency: National Science Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: The Commission has broad concerns for science education at all levels. This includes not only an interest in curriculum development for grades K through 16, but also of science teacher education at all academic levels. It is also concerned about the relation between the new course developments in the natural sciences and the social sciences.

To assist course content projects, the Commission has agreed to:

1. Maintain a continuous review of work being done under its own and other auspices and of the kinds of additional work that would most effectively supplement what has already been started.
2. Develop interest within the scientific community and recruit scientists to work on the development of elementary and junior high school science materials.
3. Arrange conferences, communication, and exchange of materials as the need arises among various groups working in this area.
4. Serve as an advisory body upon request to persons interested in the establishment of new programs or centers for the development of elementary or junior

high school science materials and to agencies considering giving financial support to such ventures.
5. Provide interpretation and help to schools in the selection and use of new science materials.
6. To encourage improvement of science education in the early grades, the Commission is preparing and evaluating the materials described below.
7. To disseminate information about curriculum developments it sponsors a clearinghouse of information and proposes to arrange meetings of administrators to inform them about the new elementary science projects.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: The elementary science materials written to date are for kindergarten through sixth grade. The subject matter is drawn from various fields in science.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION: Science--A Process Approach in seven volumes plus Commentary for Teachers:

1. Part One - Publication #65-14A & B - 24 exercises
2. Part Two - #65-15A & B - 26 exercises
3. Part Three - #65-16A & B - 26 exercises
4. Part Four - #65-19A & B - 26 exercises
5. Part Five - #65-20A & B - 27 exercises
6. Part Six - #65-21A & B - 28 exercises
7. Part Seven - #65-23A & B - 27 exercises
8. Commentary for Teachers #65-22
9. The Process Instrument - #65-25
10. Competency Measures Parts One and Two -#65-26-1-2
11. Competency Measures Parts Three and Four - #65-26-3-4
12. Competency Measures Parts Five, Six A, and Seven A - #65-26-5, 6A, 7A
13. Competency Measures Parts Six B and Seven B - #66-5-6B, 7B
14. The Psychological Bases of Science-- A Process Approach - #65-8
15. An Evaluation Model and Its Application - Science--A Process Approach - #65-9
16. Science Education News - November 1963 - Description of the program
17. Newsletter - Volume 1, three issues, December 1964 to May 1965; Volume 2, four issues, October 1965 to June 1966

18. "Research in Science Education", H. A. Smith, Journal of Research in Science Teaching, Vol. 1, Issue 3, pp 199-225 (1963)
19. "Curriculum Evaluation by Means of Behavioral Objectives", Henry H. Walbesser, Journal of Research in Science Teaching, Vol. 1, pp 296-301 (1963)
20. "AAAS Commission on Science Education", Arthur H. Livermore, Journal of Research in Science Teaching, Vol. 2, pp 271-282 (1964)
21. "Elementary Science: A New Scheme of Instruction", Robert M. Gagne, Science, Vol. 151, pp 49-53 (1966)
22. "Help Stamp Out Non-Behavioral Objectives", Edwin B. Kurtz, Jr., The Science Teacher, Vol. 32, No. 1 (1965)
23. "Science Curriculum Evaluation: Observations on a Position", Henry H. Walbesser, The Science Teacher, Vol. 33, No. 2 (1966)
24. Equipment kits for Parts One through Seven
25. Kits for testing individual processes, e.g. observation, measurement

X. USE OF YOUR PROJECT MATERIALS: Two hundred and fifty teachers are using complete program, and several hundred are using portions of it.

Specific schools where materials are used: F. O. Holaway School, Homer Davis School, Lineweaver School, Douglas School, Sewell School, Iola Frans School, Cragin Elementary School, Tucson, Ariz.; University School, Bond School, Kate Sullivan School, Tallahassee, Fla.; P.S. #99, P.S. #219, P.S. #245, Baltimore, Md.; Casis School, Govalle School, Robert E. Lee School, Highland Park School, Austin, Texas; Colonial School, Siwanoy School, Hutchinson School, Prospect Hill School, Pelham, N. Y.; Walton School, Philadelphia, Pa.; Sacajawea School, Laurelhurst School, Sand Point School, Roxhill School, Seattle, Wash.; Willitts School, Lincoln School, Garfield School, Harding School, Monmouth, Ill.; South School, North School, Central School, Glencoe, Ill.; University of Chicago Laboratory School, Chicago, Ill.; China Lake Schools, Greenfield Union Schools, Wasco Union Schools, Kern County, Calif.; Washington School, Berkeley, Calif.; Addison School, Loma Vista School, Stanford School, Escondido School, Barron Park School, Palo Alto, Calif.; Skyline School, Markham School, Woodlawn School, Rice School, Applegate

School, Wilcox School, Sylvan School, Atkinson School, Meek School, Duniway School, Vestal School, Portland, Ore.; Northeast School, Danby School, Belle Sherman School, Fall Creek School, South Hill School, Enfield School, West Hill School, East Hill School, Central School, Caroline School, St. John School, Cayuga Heights School, Ithaca, N. Y.; H. B. Patch School, Jefferson Elementary School, Emmeline Cook School, Omro Jr. High School, Oshkosh, Wisc.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGE INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: No translations planned at present

XIII. MATERIALS PRESENTLY BEING DEVELOPED:
26. Films for teacher education

XIV. MATERIALS AVAILABLE FREE:
17. Newsletter
14, 19, 20, 21, 22, 23 (limited number of reprints)
Write--Commission on Science Education, AAAS

XV. MATERIALS PURCHASABLE:

1. Part One - 2.25
2. Part Two - 2.25
3. Part Three - 2.25
4. Part Four - 2.25
5. Part Five - 2.25
6. Part Six - 2.25
7. Part Seven - 2.25
8. Commentary for Teachers - 3.50

10. Competency Measures Parts One and Two - 1.50
11. Competency Measures Parts Three and Four - 1.50
12. Competency Measures Parts Five, Six A and Seven A - 1.50
13. Competency Measures Parts Six B and Seven B - 1.50

18. "Research in Science Education" - Reprints may be purchased from John Wiley and Sons, Inc., 605 Third Ave., New York 16, New York

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Elementary science materials are being tested with a competency measure which the teacher uses to test a sample of three students from her class after each exercise has been completed. In addition, the teacher submits a feedback form for each exercise. The feedback form gives the teacher's impression of the exercise and suggestions for changes. A pilot study is being made of a new process instrument designed to determine how far up a hierarchy of process skills (e.g. observation) a child has developed. A Science-Mathematics Study has been initiated. This is an investigation of the benefits to be gained and problems resulting from introducing two new programs (science and mathematics) in a single class or group of students.

The process instrument is being used as a pre-test and a post-test in several tryout centers. The competency measures serve as achievement tests. Both the process instrument and competency measures are being administered to control classes as well as to classes using Science--A Process Approach.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: A program for pre-service and in-service meetings of teachers, including specific guidelines for the instructor of these meetings, is being prepared and tested. A recommended instructional program for teachers of K to grade 3 should be available by fall 1966. The program involves the teachers in performing the tasks in the science processes; thus the process approach forms the strategy for the teacher education program. Evaluation of the teacher education materials (activities, text, films) is based on measures of teacher competencies similar to those used to assess the exercises for students. The text, Commentary for Teachers, contains self-instruction papers and self-assessment items for teaching the teacher about the process approach and how to perform the tasks in the science processes, and provides background information about science content needed for the classroom exercises.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: A writing conference was held for eight weeks at Michigan State University during the summer of 1965. The writers were college and university scientists, elementary school teachers, and administrators. The K-5 program which was tried out during 1964-65 was revised and new exercises were written for tryout in grade 6. The exercises were tried out in demonstration classes during the writing session. New equipment was designed and kits were prepared for Parts One through Seven. The evaluation materials were revised and the process test was developed. New teacher training materials were prepared (see item XVII). Exercises in Parts One through Four are being prepared for commercial publication.

A three-day conference on junior high school science was held at Michigan State University.

Two 3-day conferences on Frontiers in Science for school superintendents were sponsored jointly with the American Association of School Administrators.

XIX. PLANS FOR THE FUTURE:

A. Publication: A publisher will be selected during the summer of 1966, and Parts One through Four will be published in the fall of 1967.

B. Summer Writing: A writing conference to revise the exercises in Parts Five through Seven will be held in June and July at the University of Maryland. In addition to revising the exercises the writers will revise the evaluation materials, the teacher education program, and the teaching kits.

C. Tryout: The revised materials, Parts Five through Seven, will be tried out by approximately 90 teachers in 1966-67.

D. Other Plans - 1966-67:

1. A ten-day conference on Science Education in the Next Decades will be held at Dartmouth University in June 1966. A report of the conference will be published.

2. A study on the costs of introducing new science programs into schools will be carried out.

3. A study of trends in school construction will be made.

4. The Science-Mathematics Study will be continued.

5. In collaboration with the American Association of School Administrators several conferences for school administrators will be held.

6. The clearinghouse, under the direction of Dr. David Lockard, will be further expanded to include more information about science curriculum developments in other countries.

I. PROJECT TITLE: Anthropology Curriculum Study Project

II. PRINCIPAL ORIGINATOR: American Anthropological Association Committee on Anthropology in the High School; Malcolm Collier, Chairman

III. PROJECT DIRECTOR: Malcolm Collier

IV. PROJECT HEADQUARTERS ADDRESS: 5632 Kimbark Avenue, Chicago, Illinois 60637

V. PROFESSIONAL STAFF: Robert G. Hanvey, Curriculum Research Director; Alex Weingrod, Research Director; Edwin Dethlefsen, Unit Director, "The Study of Early Man"; Patty Jo Watson, Unit Director, "The Great Transformation"; Stephen T. Boggs, Executive Secretary, American Anthropological Association

VI. PROJECT SUPPORT:
A. Organizational sponsorship: American Anthropological Association
B. Funding agency: National Science Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: To bring to a wide range of high school students some of the data on human history and human behavior, and some of the modes of inquiry characteristic of anthropology.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Bio-cultural evolution; human prehistory; varieties of human societies and cultures; anthropological concepts relevant to historical events; case studies of modern societies; human diversity. Grade level: primarily 9th and 10th grades; also junior high school

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Newsletter
2. An Anthropological Contribution to the Teaching of State History
3. Teaching About Ethnocentrism
4. Anthropology and World History Texts
5. Evaluation of Encyclopedia Articles
6. Education and the Social Sciences
7. Bibliography on Anthropology and Education
8. Raising the Standard of Learning in the Social Studies
9. A Strategy for Educational Change
10. Anthropology in the Schools
11. The Great Tree and the Longhouse (and a Teacher's

Manual)

12. Kiowa Years and Kiowa Profile (and a Teacher's Manual)
13. An Annotated Bibliography of Anthropolitical Materials for High School Use
14. The Idea of Liberty in American Culture
15. Study of Early Man
16. Great Transformation
17. Studying Societies

2-10 are Occasional Papers; 11-12 are case studies of American Indians. In experimental use:

"Study of Early Man": the very long, early career of our species--man the hunter-gatherer and its implications for modern man

"Great Transformation": the major cultural transformation triggered by the beginning of agriculture

"Studying Societies": a model for analyzing historical societies in anthropological terms

X. USE OF PROJECT MATERIALS: In 1966-67, "The Study of Early Man" and "The Great Transformation" will be taught by 58 teachers. Schools where the course is being taught include: Calumet, Bowen, and Gage Park High Schools, Chicago; Abington High School, North Campus, Abington, Pa.; Lake Washington High School, Kirkland, Wash.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:

18. Africa)
19. Latin America) area studies
20. Middle East)
21. Human diversity
22. Films of classroom use of ACSP materials

XIV. MATERIALS AVAILABLE FREE: 1, 2, 8, 9, 10 (from ACSP office)

XV. MATERIALS PURCHASABLE: 11-14 to be published by the Macmillan Company; 11 will be available August 1966; 12-14 subsequently.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Pre-tests and post-tests; classroom observation; student and teacher interviews.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: An extensive, detailed handbook and a set of annotated reference books supplied to each teacher; films of classroom teaching to be used for discussion by cooperating teachers; development of models of content and pedagogy for use in workshops and in social studies methods courses; initiation of teacher services such as newsletter and information clearinghouse.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported

XIX. PLANS FOR THE FUTURE: Testing and revision of classroom materials; development of teacher services

I. PROJECT TITLE: Arlington County K-12 Curriculum Development Project

II. PRINCIPAL ORIGINATOR: Arlington County Schools

III. PROJECT DIRECTOR: Harold M. Wilson, Associate Superintendent of Schools, Arlington, Va.

IV. PROJECT HEADQUARTERS ADDRESS: 4751 - 25th Street, N. Arlington, Va.

V. PROFESSIONAL STAFF: Louis Baker, K-12 Science Committee Chairman, Yorktown High School, 5201 W. 28th Street, Arlington, Va.; Alex Costea, K-6 Supervisor, and Phoebe Knipling, 7-12 Supervisor

VI. PROJECT SUPPORT:
A. Organizational sponsorship: None
B. Funding agency: Arlington County Schools

VII. SPECIFIC PURPOSES AND OBJECTIVES: To develop and implement an articulate K-12 science curriculum

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL:
K-6: Living Things; Earth and Universe; Matter and Energy
K-7: Enrichment programs
K-8: General Science; Science - Part I
K-9: Earth and Space Science; Science - Part II; Summer Enrichment Seminars(no credit) - General Science, Earth and Space Science
K-10-12: Biology I; Biology II; Chemistry; Physics I; Physics II; Physical Science; History and Philosophy of Science (1/2 credit); Summer Enrichment Seminars (no credit) - General.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Laboratory Experiences for Junior High School Science
2. Biology Laboratory Guide, Grades 10-12, 1964
3. Earth and Space Science Course Guide
4. Earth and Space Science Laboratory Guide
5. Physical Science Laboratory Guide

X. USE OF PROJECT MATERIALS: All elementary teachers and all secondary science teachers are using the complete program which is being taught in Abingdon; Claremont; Jamestown; Reed; McKinley; Page; Kenmore; Swanson; Yorktown; Washington-Lee, Virginia.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:
6. K-6 Scope and Sequence and activities to accompany matter and energy concepts
7. K-12 Curriculum for Outdoor Education

XIV. MATERIALS AVAILABLE FREE: Materials 3-7 in mimeograph and ditto have been produced in quantities for own use only.

XV. MATERIALS PURCHASABLE:
1. \$3.00; 2. \$3.50; 5. \$3.50

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: 30 to 50 teachers who have demonstrated interest in maintaining an active science program in their classrooms have been invited to test materials that have been newly developed. The test of materials consists wholly in using the information and ideas with children. At this time our purpose is to find concepts and activities in science that appeal to children and tend to produce experiences through which children will come to understand scientific reasoning and processes. Suggestions are received from all teachers teaching the subject. Course guides are then prepared including suggestions from all teachers. These are distributed and used on a trial basis. Deletions, substitutions and additions are then made. Laboratory experiments are mimeographed and distributed for trial. Evaluations are submitted and used as a basis for revision before being produced in printed form.

Until such time as a large enough number of children and teachers have worked with many variations of our concepts and activities program, our plan is to continue evaluating this scope and sequence development annually. Each year a large area of science content will be developed.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Continuous inservice programs.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: We now have the following:
Working philosophy

- Working scope and sequence
- Available equipment
- Student guides
    - General Science
    - Earth and space
    - Biology
    - Physical science (10-12)
- Teacher inservice training
- Initiating: BSCS (Yellow), 10th grade; BSCS-SM, 10th grade; CHEM Study
- 1965-66 testing of the following:
    - Scope and sequence K-6
    - Physical science student manual, grades 10-12
    - Earth and space student manual, 9th grade
    - Physical science, K-6

XIX: PLANS FOR THE FUTURE:

- Summer, 1966 - Develop:
    - Living Things, K-6
    - Physical science (final form), grades 10-12
    - Outdoor Education, K-12
    - Planetarium education, K-12
    - Revision of Science I and II (slow learners- junior high school)
    - Revision of Laboratory Experiences for Junior High School
    - Earth and space, K-6
- 1966-67 Testing:
    - Living Things, K-6
    - Outdoor Education, K-12

I. PROJECT TITLE: Biological Sciences Curriculum Study (BSCS)

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: American Institute of Biological Sciences. 1959

III. PROJECT DIRECTOR: William V. Mayer

IV. PROJECT HEADQUARTERS ADDRESS: University of Colorado, P. O. Box 930, Boulder, Colo. 80302

V. PROFESSIONAL STAFF: At University of Colorado: Norman Abraham, Associate Director; George Clark, Assistant Director for Fiscal Affairs; Jayne Bendetti, Administrative Assistant; Richard Casebeer, Consultant; Bert Kempers, Consultant; Manert Kennedy, Consultant; Urless Lanham, Consultant; Jane Larson, Art Director; Glen Peterson, Consultant; Margaret Sterling, Business Manager; Doreen White, Administrative Assistant; Mary Bartlett, Administrative Assistant. At University of Texas, Austin: Addison Lee, Project Director; Marjorie Behringer, Project Associate; Bobby Woodruff, Project Associate. At University of California, Davis: Donald M. Reynolds, Consultant

VI. PROJECT SUPPORT:
A. Organizational sponsorships: AIBS, 1959-63; University of Colorado, 1963-present
B. Funding agencies: National Science Foundation; NSF/AID; Asia Foundation, Rockefeller Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: To contribute to the improvement of biological education through the preparation of curriculum materials related to the study of biology.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: First course in secondary school biology (9th and 10th grades); Second course in secondary school biology (12th grade); Supplementary materials for all secondary school levels in biology; Special materials for low-ability high school students; Materials for teachers of biology.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Blue Version - Biological Science: Molecules to Man: Houghton Mifflin Company, 110 Tremont St., Boston, Mass. 02107

2. Green Version - High School Biology, BSCS Green Version: Rand McNally & Co., P. O. Box 7600, Chicago, Ill. 60680

3. Yellow Version - Biological Science: An Inquiry Into Life: Harcourt, Brace & World, Inc., 757 Third Ave., New York, N. Y. 10017

4. BSCS Version Quarterly Tests in two alternate forms are available through the version publishers.

5. BSCS Comprehensive Final Exam in two alternate forms and Processes of Science Text: for all versions: The Psychological Corp., 304 E. 45th St., New York, N. Y. 10017

6. BSCS Second Course - Biological Science: Interaction of Experiments and Ideas: Prentice-Hall, Inc., Englewood, N.J. 07632 (experimental editions of three quarterly tests and final examination are available from the publisher for classroom use during 1965-1966; no samples available).

7. Laboratory Blocks - Plant Growth and Development; Animal Growth and Development; Microbes: Their Growth, Nutrition and Interaction; The Complementarity of Structure and Function; Field Ecology; Regulation in Plants by Hormones - A Study in Experimental Design; Animal Behavior; Life in the Soil; Genetic Continuity: D. C. Heath & Co., 285 Columbus Ave., Boston, Mass. 02116

8. Teachers' Handbook - Biology Teachers' Handbook: John Wiley & Sons, Inc., 605 Third Ave., New York, N. Y. 10016

9. Biological Investigations for Secondary School Students-Research Problems in Biology: Investigations for Students, Series One, Two, Three, and Four: Doubleday & Co., 575 Madison Ave., New York, N. Y. 10017

10. BSCS Pamphlet Series (24 titles): D. C. Heath & Co., 285 Columbus Ave., Boston, Mass. 02116

11. BSCS Techniques Films (for teacher preparation): Thorne Films, Boulder, Colo. 80302, 16 mm. sound; Ealing Corp., Cambridge, Mass. 01922, 8 mm. loop, silent.

12. BSCS Special Materials - Biological Science: Patterns and Processes: Holt, Rinehart and Winston, Inc., 383 Madison Ave., New York, N. Y. 10017

THE FOLLOWING (13 through 17) available from the BSCS, P.O. Box 930, Boulder, Colo. 80302

13. BSCS Bulletin Series
14. BSCS NEWSLETTER (Free upon request)
15. BSCS Special Publication Series
16. Laboratory Blocks, experimental editions
17. The Story of the BSCS: (BSCS Information Film; free loan upon request.

X. USE OF PROJECT MATERIALS: An estimated 10,000 to 15,000 teachers are using the program, and 10,000 to 15,000 additional teachers are using portions of it. Specific schools where materials are used: Baltimore School System; Houston System; Denver; Detroit, Chicago.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Spanish, Portuguese, Italian, French, Chinese, Japanese, Russian, Hebrew, Turkish, Thai

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: 18. BSCS Single-Topic Films: Series in preparation; distributors have not yet been designated.

XIV. MATERIALS AVAILABLE FREE: Nos. 14, 15, and 17

XV. MATERIALS PURCHASABLE: Nos. 1-13, and 16. Costs available from publishers.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: A pattern has been established for the evaluation of all BSCS classroom materials. The general parameters of this evaluation are indicated in BSCS NEWSLETTER No. 19. These include broad scale evaluation with the following facets: trial use in many different kinds of schools; reviews by persons in biology, education and psychology; classroom visits to test schools by authors and BSCS staff consultants; feedback from individual experimental teachers and students; and from groups of experimental teachers who meet regularly for the purpose of providing feedback. In addition, specially developed tests are administered to experimental students, and where practical, to control students.

BSCS classroom materials are issued in a preliminary experimental edition and a revised experimental edition before a final rewriting for general release. The revisions made for the revised experimental edition and commercial edition reflect the results of feedback from various facets of evaluation. BSCS Biology, Blue, Green and Yellow Versions were tested over a three-year period with some 1,000 teachers and 165,000 students prior to general release. Parallel evaluations have been done on the Special Materials and Second Course programs. Detailed evaluation reports are included periodically in BSCS NEWSLETTERS.

BSCS evaluation is a continuing activity so that after classroom materials are generally released, further descriptive data may be obtained for future revisions of the materials.

In the testing program, all students are given verbal and numerical ability tests. The SCAT and DAT have been used with different groups of students. For the version program, a control group was used for two years. For the other programs and for the current version program, a control group has not seemed practical. (Rationale here is included in BSCS NEWSLETTER reports.) Because BSCS materials are quite different in content, purpose and philosophy from conventional materials, existing examinations developed for conventional materials are not considered relevant. The BSCS has therefore, developed multiple choice examinations which, in the minds of the writers of the material and the BSCS Evaluation Committee, reflect many of the aims and objectives of the BSCS. These are the tests that have been used to describe student performance in the BSCS evaluation. During the experimental period, testing is carried out with an idea of improving the materials. After the materials are in commercial publication, testing is carried on: to improve the existing tests and norm them so that these tests may become part of the curriculum; to better describe the materials to potential users and other interested persons; and to obtain further feedback with a view to eventual revision of the materials.

The BSCS evaluation program is an on-going activity, where the emphasis changes at different points of the development of the materials, and where testing is only one of several facets. The BSCS recognizes that thus far the evaluation in terms of test development is only a beginning, that there are many BSCS aims and objectives that have not yet been adequately measured by means of tests. It is our plan to develop further types of experimental testing materials to examine the extent to which other aims and objectives have been achieved.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: The BSCS has prepared a guide to teaching academically unsuccessful students that can be used by colleges and universities as an aid in teacher preparation. A series of films is planned that will show highly successful U. S. teachers working with students in the classroom, field and laboratory. The BSCS Teacher Preparation Committee will continue to explore ways to increase the competence of teachers both in subject matter background and in methodology. Briefing Sessions for teachers of Special Materials have been held; it is proposed to hold other series in the summer of 1966.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: The Commercial edition of BSCS Special Materials, Biological Science: Patterns and Processes will be published by Holt, Rinehart and Winston, N. Y., in July of 1966; BSCS Special Publication No. 4, The Teacher and BSCS Special Materials, will be available in May of 1966; the Single Topic film series emphasizing inquiring has been evaluated in the schools and is now ready to go into commercial distribution with several films; others are still being developed and tested in the schools. Substantial revisions of each of the basic Versions will take place in the summer of 1966 with revised editions to be published in 1968.

XIX. PLANS FOR THE FUTURE: The preparation of biology curriculum materials for the junior high school is under consideration. Additional Single-Topic Films, Pamphlets, and Laboratory Blocks are planned.

Revision of the commercial editions of the three versions is scheduled to begin during the summer of 1966 for release in 1968. A writing conference to prepare storyboards and Teachers' Guides for single topic films will be held in the summer of 1966.

A continuation and expansion of the evaluation and testing of all BSCS materials. An exploration of all possible avenues to increase the effectiveness of teachers through teacher preparation programs.

I. PROJECT TITLE: Boston College Mathematics Institute

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Stanley J. Bezuszka, S.J. June, 1957

III. PROJECT DIRECTOR: Stanley J. Bezuszka, S.J.

IV. PROJECT HEADQUARTERS ADDRESS: Boston College Mathematics Institute, Chestnut Hill, Mass. 02167

V. PROFESSIONAL STAFF: Albert A. Bennett, Consultant; Mary E. Farrey, Staff Assistant; Margaret J. Kenney, Staff Assistant, and Francis Torras, S.J., Consultant

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Boston College
B. Funding agency: National Science Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: The major objective of the institute program is to develop text materials for both the secondary school student and teacher and to prepare teachers in the concepts of contemporary mathematics.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: The institute program encompasses grades 7 through college sophomore directly, and the elementary grades to a certain extent, through consultation services. Emphasis is currently on the preparation of a computer oriented mathematics text, correspondence courses for teachers and a calculus text for secondary school students.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Contemporary Progress in Mathematics, Parts 1 and 2
2. Contemporary Progress in Mathematics, Parts 1 and 2 - Teacher Manual
3. Contemporary Progress in Mathematics, Part 3
4. General Contemporary Mathematics
5. Sets, Operations and Patterns
6. Sets, Operations and Patterns - Teacher Manual
7. Heritage Builders in the Arts and Sciences
8. Cooperative Unit Study Program, Course 1 - Teacher Edition
9. Student Edition
10. Cooperative Unit Study Program, Course 2

X. USE OF PROJECT MATERIALS: A rough estimate is that at least 100 teachers are now using some of our materials in one way or another. Some specific schools where materials are used: Watertown Public Schools, Watertown, Mass.; Lowell Public Schools, Lowell, Mass.; Eureka Public Schools, Eureka, Calif.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:
11. Computer Oriented Mathematics (a text for the secondary school student and certain college freshmen)
12. Calculus (a text for the secondary school student and certain college freshmen)
13. Cooperative Unit Study Program, Course IE (a correspondence program for the elementary school teacher)

XIV. MATERIALS AVAILABLE FREE: None

XV. MATERIALS PURCHASABLE: Nos. 1-10, from: Mathematics Institute, Boston College, Chestnut Hill, Mass. 02167
1. $2.50 + .25 (postage)
2. 1.25 + .25
3. 1.25 + .25
4. 1.00 + .25
5. 3.25 + .25
6. $1.00 + .25
7. 1.75 + .25
8. Teacher Ed., 4.50 + .50
9. Student Ed., 4.00 + .50
10. 4.50 + .50

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: No formal evaluation is in progress since the program is not yet complete.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Teacher preparation will continue in the form of several types of institute programs which will be offered during the school year and the summer. Emphasis will be placed on the correspondence programs for those teachers unable to attend institutes. School system in-service programs will be staffed by trained former members of on-campus institutes.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 Report: The Project at Boston College has been involved in the following activities since March 1965:
1. Institutes and workshops reaching approximately 500 teachers of levels K-12
2. Secondary school computer oriented mathematics program involving both secondary school students and

teachers and preliminary versions of a text for this group
3. Consultation services for an elementary text series, actual writing of a grade seven text and research for a secondary school teacher correspondence program

XIX. PLANS FOR THE FUTURE: Plans for the future include work similar to that described in XIII and XVIII.

I. PROJECT TITLE: Chemical Bond Approach Project (CBA)

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: L. E. Strong; H. A. Neidig; L. B. Clapp; M. K. Wilson; A. H. Livermore. 1959

III. PROJECT DIRECTOR: Laurence E. Strong

IV. PROJECT HEADQUARTERS ADDRESS: Earlham College, Richmond, Indiana 47375

V. PROFESSIONAL STAFF: None

VI. PROJECT SUPPORT:
A. Organizational sponsorship: None listed
B. Funding agency: National Science Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: Design of introductory course in chemistry. Course includes classroom text and laboratory experiments. Presentation of chemistry as a process of investigation with imaginative ideas used to interpret laboratory findings. Several novel ways of presenting certain topics in chemistry have been developed.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Chemistry, 11th and 12th grades and first year of college.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
From McGraw-Hill
1. Text, Chemical Systems
2. Students' laboratory guide, Investigating Chemical Systems
3. Teachers' Guide to Chemical Systems
4. Teachers' Guide to Investigating Chemical Systems
5. Set of examinations
From Earlham College
6. Supplementary Readings from Journal of Chemical Education
7. Electrostatics and Potential Energy - self-instruction programs (bound edition)
8. Self-instruction Program on Charge Cloud Model - Part I
9. Self-instruction Program on Charge Cloud Model - Part II
10. Chart of electronegativities - atomic and ionic radii

X. USE OF PROJECT MATERIALS: Specific schools where materials are used: Marple-Newtown High School, Newtown Square, Pa.; Roxbury Latin School, W. Roxbury, Mass.; Warren High School, Downey, Calif.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Japanese (Iwanami Shoten); Portuguese (IBECC-UNESCO, Sao Paulo, Brazil); Spanish (Editorial Reverte)

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: None

XIV. MATERIALS AVAILABLE FREE: Newsletters - contact McGraw-Hill Book Company, Webster Division - publisher of the Newsletter.

XV. MATERIALS PURCHASABLE:
From McGraw Hill: 1. $6.96*; 2. 2.12*; 3. 5.00; 4. 5.00; 5. Contact McGraw-Hill for prices. *List price. Educational discount applicable.
From Earlham College: 6. $2.00; 7. 1.00*; 8. .40; 9. .40; 10. 2.00. *List price. Quantity discounts available.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Project evaluation was reported in:
A. H. Livermore & F. L. Ferris, "The Chemical Bond Approach Course in the Classroom," Science, Dec. 7, 1962, Vol. 138, No. 3545, pp. 1077-80.
R. W. Heath & D. W. Stickell, "CHEM & CBA Effects on Achievement in Chemistry," The Science Teacher, Vol. 30, No. 5, Sept. 1963.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Summer Institutes

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Publication of Electrostatics and Electric Potential Energy, Earlham College Press, Richmond, Ind.

XIX. PLANS FOR THE FUTURE: None, project is considered complete.

I. PROJECT TITLE: Chemical Education Material Study (CHEMS)

II. PRINCIPAL ORIGINATORS: Glen T. Seaborg, Chairman, Steering Committee (at that time Chancellor, University of California, Berkeley, Calif.); J. Arthur Campbell, Director (until 9/63), Professor of Chemistry, Harvey Mudd College, Claremont, Calif.

III. PROJECT DIRECTOR: George C. Pimentel, Professor of Chemistry, University of California, Berkeley, Calif.

IV. PROJECT HEADQUARTERS ADDRESS: Wing B, Gayley Road, University of California, Berkeley, Calif. 94720

V. PROFESSIONAL STAFF: Richard J.Merrill, Executive Director and David W. Ridgway, Director of Film Activities

VI. PROJECT SUPPORT:
A. Organizational sponsorships: University of California, and (until 9/63) Harvey Mudd College, Claremont, Calif.
B. Funding agency: National Science Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: To diminish the current separation between scientists and teachers in the understanding of science; to stimulate and prepare those high school students whose purpose it is to continue the study of chemistry in college as a profession; to further in those students who will not continue the study of chemistry after high school an understanding of the importance of science in current and future human activities; to encourage teachers to undertake further study of chemistry courses that are geared to keep pace with advancing scientific frontiers, and thereby improve their teaching methods.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Senior high school chemistry

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Chemistry -- An Experimental Science (Textbook, 466pp., clothbound)
2. Chemistry -- An Experimental Science (Laboratory Manual, 138pp., paperbound)
3. Chemistry -- An Experimental Science (Teacher's Guide, 785pp., paperbound)

4. Programmed instruction pamphlets: Sliderule (64pp.); and Exponential Notation (31pp.)
5. Achievement tests (set of 7 open-book, multiple choice tests, including 5 tests each covering 3 or 4 chapters, a semester final, and a year final); 2 series, designated 1963-64 and 1964-65
6. Motion pictures for the course (26); two teacher training films
7. CHEM Study Newsletter (issued twice yearly)
8. Teacher's Guide to the CHEM Study Films (102pp., paperbound)

X. USE OF PROJECT MATERIALS: Approximately 2,500 teachers are using the complete program. Schools where the materials are being used: List, by states, available from CHEM Study office.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Chinese, French, Japanese, Portuguese, Spanish, Thai, and Turkish.

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Additional motion pictures; filmstrips; and film loops

XIV. MATERIALS AVAILABLE FREE: No. 7; No. 8 (one copy provided without extra charge to teachers using the textbook and laboratory manual in quantity).

XV. MATERIALS PURCHASABLE: Items 1-5, above, available from W. H. Freeman Co., 660 Market Street, San Francisco, Calif. 94104 (list prices F.O.B. shipping point, subject to normal educational discount).
1. $5.80
2. $1.60
3. $7.00
4. $ .50/set
5. $1.00/set
6. Films available from Modern Learning Aids, 3 East 54th St., New York, N. Y. 10022
8. $2.00 (free with purchase or rental of films) from Modern Learning Aids

XVI. SPECIFIC PLANS FOR EVALUATION: Trial editions of course materials were tested over a three year period in a total of 550 schools with about 60,000 students. List published in CHEM Study Newsletters of March, 1962, and October, 1962, describes the testing program. Feedback was gathered through weekly (later bi-weekly) meetings of teachers involved, and by questionnaires. Limited follow-up study at University of California, Berkeley, Calif., indicates CHEM-Study-prepared students had an advantage in qualifying for the accelerated freshman course. Further follow-up studies are being undertaken to determine effect on high school science enrollments, performance in college chemistry, and understanding of the nature of science.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Comprehensive teacher's guide available. Teacher-training films on atomic structure and bonding recently produced. Consultant services to directors or institutes and other teacher-preparation programs.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: The Study has initiated evaluative surveys and has continued to provide consultant services, on request, to those concerned with teacher preparation.

XIX. PLANS FOR THE FUTURE: Reduction of activities to bare minimum administrative functions by September, 1966.

I. PROJECT TITLE: Computer-Based Mathematics Instruction (CBMI)

II. PRINCIPAL ORIGINATOR: Patrick Suppes, Professor of Philosophy and Statistics, Stanford University

III. PROJECT DIRECTOR: Patrick Suppes

IV. PROJECT HEADQUARTERS ADDRESS: Ventura Hall, Stanford University, Stanford, Calif. 94305

V. PROFESSIONAL STAFF: Research Associates: Luanne Berkowitz; Frederick Binford; Dow Brian; Phyllis Cole; Jamesine Friend; Constance Ihrke; Max Jerman; Leo Keller; Dolly Kyser; Dana Scott, Professor, Department of Mathematics, Stanford University.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Institute for Mathematical Studies in the Social Sciences, Stanford University.
B. Funding agencies: National Science Foundation and Office of Education; Carnegie Corporation of New York.

VII. SPECIFIC PURPOSES AND OBJECTIVES: Development and testing of computer-based curriculum in elementary school mathematics.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: At present we are working on a complete mathematics curriculum for grades 1, 2, and 4, with drills for grades 1-8, and a special course in mathematical logic for able fourth, fifth, and sixth graders.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Information Sheet on Materials
2. Computer-Based Mathematics Instruction (9-1-63 to 8-31-64)
3. Accelerated Program in Elementary School Math (9-1-63 to 8-31-64)
4. Reprint from Theory into Practice, 1964
5. Reprint from Mathematics Teachers Journal, April 1963
6. Reprint from The Arithmetic Teacher, 1962
7. Reprint from Grade Teacher, April 1962
8. Reprint from Science Education, April 1962
9. Reprint from The Arithmetic Teacher, 1961
10. Sets and Numbers Books, K-6 grades

11. First Course in Mathematical Logic
12. Modern Learning Theory and the Elementary-School Curriculum, Reprint from American Educational Research Journal, March 1964
13. Arithmetic Drills and Review on a Computer-Based Teletype, Tech. Report 83
14. Accelerated Program in Elementary-School Mathematics (9-1-64 to 8-31-65), Tech. Report 86
15. Computer-Based Mathematics Instruction: The first year of the Project

X. USE OF PROJECT MATERIALS: Specific schools where materials are being used: Kavanaugh School, East Palo Alto; Grant School, Cupertino, California.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Programs for grades 1 and 4, and additional drills.

XIV. MATERIALS AVAILABLE FREE: All items in IX, above, except Nos. 10 and 11.

XV. MATERIALS PURCHASABLE:
10. Sets and Numbers Books, K-6 grades. Purchase through L. W. Singer Co., 249 West Erie Boulevard, Syracuse, N. Y. 13201
11. First Course in Mathematical Logic. Purchase through Blaisdell Publishing Co., 275 Wyman Street, Waltham, Mass. 02154

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Preliminary experiments for first and fourth grade programs and for the logic material have been conducted. In the computer-based environment in which we are now working, it is possible to use much deeper behavioral analysis than in ordinary curriculum work. The standard statistical tools of modern learning theory are being applied. General and standard achievement tests will also be given to determine some measures of validity. The computer facilities will make possible storage of large amounts of data on each student's performance, including individual errors and response latencies on each problem. Long-term details of our testing program have not yet been worked out for the computer-based project on which we are now putting our main effort.

XVII. **SPECIFIC PLANS FOR TEACHER PREPARATION:** At present, we are not working on teacher preparation. This will probably become a focus of some of our activities within about 18 months.

XVIII. **PROJECT ACTIVITIES SINCE MARCH 1965 REPORT:** In 1964-65, two second-grade boys worked through a portion of the logic program (March 15-May 19) and 26 gifted second-grade children worked through a revision of the logic during the summer (July 5-30). By remote control, 41 fourth-grade children were given daily drill-and-practice lessons on a teletype machine in their classroom 11 miles from Stanford (April 19-June 4). During the 1965-66 school year, starting in October, teletype drills were given to 80 fourth graders, 60 fifth graders, and 60 sixth graders, in the same elementary school. In March, 60 third-graders were added to the drill program at that school. In February, 1966 remedial mathematics drills were given by teletype to over 40 students at an East Palo Alto high school.

In April, 1966, daily sessions in one Stanford laboratory were held for 8 kindergarten students, who worked on Grade 1 material, and for 8 first-grade students who began work on grade 2 material. Weekly sessions on logic material were begun for 30 sixth graders on May 5 and for 7 fourth graders on May 19.

XIX. PLANS FOR THE FUTURE: Drills for grades 7 and 8 will be prepared, and drills for all other grades will be revised. The logic material is being revised and extended for grades 1 and 2. Our present laboratory is the computer-based laboratory for learning and teaching at Stanford. We now have planned and contracted for a system that will be installed in a local school in the summer of 1966. The new system will consist of 16 terminals permitting 16 students to work independently at the same time. The present laboratory at Stanford has 6 terminals.

I. PROJECT TITLE: Curriculum Development of Teaching Guides for Science (Chicago)

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: Benjamin C. Willis, General Superintendent of Schools; Evelyn F. Carlson, Associate Superintendent, Department of Curriculum; Ellen Brachtl, Chairman, Curriculum Council Committee. 1963

III. PROJECT DIRECTOR: Evelyn F. Carlson, Associate Superintendent

IV. PROJECT HEADQUARTERS ADDRESS: 228 North LaSalle Street, Chicago, Illinois 60601

V. PROFESSIONAL STAFF: Benjamin C. Willis, General Superintendent of Schools; Evelyn F. Carlson, Associate Superintendent, Department of Curriculum; Ellen Brachtl, Chairman, Curriculum Council Committee; Mary C. Lacy, Director of Publications; Marjorie B. Molyneaux, Science Coordinator; Fred Betz, Elementary Consultant; Lucille Daly, Elementary Consultant; Louis DiSandro, Elementary Consultant; Hubert Freestrom, Elementary Consultant; Cal Markou, Elementary Consultant; Carole Nolan, Elementary Consultant; Kathleen Thom, Biology Consultant; Kathryn McHugh, Chemistry Consultant; Jens Midtaune, Physics Consultant

VI. PROJECT SUPPORT: Chicago Board of Education

VII. SPECIFIC PURPOSES AND OBJECTIVES: A coordinated, integrated, sequential science program for the elementary school presupposes certain basic objectives for each grade level which are reinforced and expanded at each succeeding grade level. These objectives are: The development of scientific concepts useful in understanding our natural environment; the development of skills of problem solving; and the development of the habit of scientific thinking.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: In the primary grades learning experiences are provided: (1) to develop an understanding of science concepts that will enable the child to describe the natural occurrences persisting about him, (2) to give the child practice in solving problems by different methods and to sensitize him to an awareness that an orderly system is always involved, and (3) to develop the understanding that scientific thinking is based on observable facts.

In the intermediate grades learning experiences are provided: (1) to develop an understanding of science concepts that will enable the child to describe and to discover the cause and effect relationships in the natural occurrences persisting about him, (2) to give the child practice in planning and using previously learned facts and principles as tools in solving problems, and (3) to develop the understanding that in scientific thinking all related evidence is applied without prejudice.

In the upper grades learning experiences are provided: (1) to develop an understanding of science concepts that will enable the child to predict and evaluate the orderly occurrences persisting in nature, (2) to give practice in solving challenging problems which bring previously unrelated but known facts and principles into a new association, and (3) to develop the understanding that scientific thinking utilizes solutions to specified problems to generalize about natural forces, and to recognize the distinction between facts, principles, and laws.

In general science 9 we have provided learning experiences for those pupils who did not gain sufficient science background in grades 7 and 8. The concepts in science 9 are identical with those of grades 7 and 8, but the learning experiences are different.

In the biology guide learning experiences are provided: (1) to develop an understanding of basic biological concepts at a broader, deeper, and more interrelated level than was offered in the elementary grades, (2) to give the student opportunity for supervised laboratory work in which laboratory techniques and skills are used in problem solving, and (3) to advance the quality of the student's scientific thinking through the development of attitudes and appreciations specific to biology, as evidenced in changed behavior.

The chemistry guide is designed to introduce the student to the facts, concepts, and theories of chemistry in a gradual and systematic manner; to develop manipulatory skills and techniques in the laboratory; and to acquire the resourcefulness, self-direction, open-mindedness, and respect for authority inherent in the development of scientific thinking.

The physics guide provides activities to enable the student to use the various systems of measurement, to work with matter in its basic states, to understand how the properties of matter depend upon the atomic structure, to know the relationship of matter and energy and their application to particles and wave motion.

Those students who through the results of tests or science teacher recommendation have been found to have developed an adequate background in science are placed directly into biology at the ninth grade level.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION: Curriculum Guides for Science: K-1; 2-3; 4-6; 7-8; General Science; Biology; Chemistry; Physics; Advanced Biology; Advanced Chemistry; Advanced Physics. Science Leaflet to Parents

X. USE OF YOUR PROJECT MATERIALS: Approximately 16,600 teachers in the Chicago Public Schools

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGE(S) INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None described

XIII. MATERIALS PRESENTLY BEING DEVELOPED: Independent Learning Activities for Science, Primary I; Physical Science Guide; Advanced Biology Guide, Unit IV

XIV. MATERIALS AVAILABLE FREE: None

XV. MATERIALS PURCHASABLE: None described

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Actual classroom use of teaching guides (four years) and an evaluation of them by all district superintendents, principals, and teachers has been carried out. The testing program is carried on individually by the city's teachers.

The method used was a questionnaire plus personal interview. The interviews were conducted by curriculum science consultants using schools randomly selected. In each school all of the teachers of a given grade were interviewed; the grade interviewed in each school was also determined by lot. Teachers of every grade were interviewed. The results of the interviews were checked against the responses received on the questionnaires.

Compilation of results of the evaluation, including responses to those questions that could be treated statistically, was completed by the Curriculum Research section of the Department of Curriculum.

Results of the evaluation were submitted to curriculum committees, composed of teachers, principals, a district superintendent, university consultants, a lay representative, and staff curriculum science consultants.

Evaluation through discussion at science workshops is being conducted by science consultants in individual schools with teachers representing each school in the district workshops.

(1) Suggestions for revision (additions, deletions, and/or upgrading of present materials) were submitted to writing committees at the levels K-3, 4-5-6, 7-8, general science, biology, advanced chemistry, advanced physics; (2) The writing committees were composed of teachers, principals, and science consultants. They wrote the revisions approved by the evaluation study and the committee during the eight-week summer session; (3) Editing, typing; (4) Re-reading, rewriting, editing, final typing; (5) Evaluation of revised materials by recognized science scholars from universities throughout the United States; (6) Necessary changes were made and guides are in production; (7) Completed revisions of guides will be presented to members of the Curriculum Council; (8) Distribution of materials will be made through district superintendents; (9) Distribution to teachers will be made by principals.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: (1) Science consultants will discuss revised guides with representative teachers from every school in a district at meetings in each district; (2) Actual classroom use; (3) Visitations by science consultants

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Completion of guides, preparation for printing and distribution

XIX. PLANS FOR THE FUTURE:

A. Following use in the schools, the new curriculum guides will be evaluated and revised to follow a regular established pattern of use and revision.

B. Data being collected on experimental programs:

Elementary

Team Teaching	Pirie and Bell Schools
Continuous Development	Elementary Schools, Primary

High School

BSCS, PSSC, CBA, Chem Study, Princeton Junior Science Program

I. PROJECT TITLE: Development of an Information System for Mathematics Curriculum Materials and Research Studies: K-6

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: Doris E. Creswell, Bureau of General and Academic Education; Emanuel Berger, Bureau of Research. January, 1965

III. PROJECT DIRECTORS: Doris E. Creswell and Emanuel Berger

IV. PROJECT HEADQUARTERS ADDRESS: Department of Public Instruction, Box 911, Harrisburg, Pa.

V. PROFESSIONAL STAFF: J. Fred Weaver, Boston University; Earle Myers, University of Pittsburgh; Lee E. Boyer, Department of Public Instruction (retired); Jack Sparks and Harold E. Mitzel, Pennsylvania State University; Gordon Barhydt, Western Reserve Univ.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: None
B. Funding agencies: Pennsylvania Department of Public Instruction and U. S. Office of Education

VII. SPECIFIC PURPOSES AND OBJECTIVES:
1. To assist local school districts in making decisions about selecting a mathematics program.
2. To provide a resource for individualizing instruction and evaluating achievement.
3. To plan in-service education compatible with the instructional materials selected.
4. To develop teacher-made diagnostic and achievement instruments.
5. To serve as a reference for developing standardized tests.
6. To be used for survey and study by methodology classes at teacher education institutions.
7. To be used as a comprehensive reference for identification of problems that need research.
8. To determine the kind and amount of change made in revision of curriculum materials.
9. To serve as a model for managing information in other curriculum disciplines.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Mathematics - Kindergarten through grade 6.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION: Does not apply

X. USE OF PROJECT MATERIALS: Does not apply

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:
1. Descriptive, annotated, and analytical information about each lesson of seventeen published basal mathematics text series. Approximately 25,000 aperture cards will comprise the "file".
2. A comprehensive list of 2,000 specific pupil behaviors compatible with each lesson described in the seventeen series.
3. Annotated, analytical information about research studies in mathematics, K-6, from 1930-1965. Approximately 3,000 research studies will be analyzed.

XIV. MATERIALS AVAILABLE FREE: None

XV. MATERIALS PURCHASABLE: At the present time none; this is a developmental project.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Seven local school districts in Pennsylvania have volunteered to test the feasibility of the information system. They are working on building a mathematics curriculum guide K-6. In doing this activity, questions are being generated that will be addressed to the information file so that the local districts can make more definitive decisions about selecting a basal textbook series. Case studies will be used to evaluate the procedures used by each district.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Not appropriate at present time

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported

XIX. PLANS FOR THE FUTURE: By January 1967 each lesson of seventeen published basal mathematics texts series will be analyzed and microfilmed on data processing cards (aperture). By January 1967 research studies in elementary mathematics, 1945-1965, will be analyzed and put into the information system. From the master list of specific pupil behaviors, a summary continuum will be developed. This will be used in lieu of a state course of study for elementary mathematics. Audio-visual materials such as films, transparencies, etc., will be analyzed and captured on aperture cards. Concrete materials such as quisenair rods, abacii, and other devices will be analyzed and captured on aperture cards. Plans for disseminating the information system to strategic state colleges are being formulated. Tentative plans for expanding the information file for curriculum materials, grades 7-12, are also being considered.

I. PROJECT TITLE: The Earth Science Curriculum Project (ESCP)

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: American Geological Institute, 1444 N Street, N.W., Washington, D. C. 20005. May, 1963

III. PROJECT DIRECTOR: Ramon E. Bisque

IV. PROJECT HEADQUARTERS ADDRESS: P. O. Box 1559, Boulder, Colorado 80301

V. PROFESSIONAL STAFF: Merrill K. Ridd, Associate Director; James H. Shea, Assistant to the Director; Robert E. Samples, Director, Laboratory Development Program, Coordinator Film Program; John W. Shrum, Director, ESCP Teacher Preparation; John F. Thompson, Coordinator, ESCP Evaluation Program, Associate Director, ESCP Teacher Preparation; Rufus F. Morton, Associate Coordinator, ESCP Evaluation Program; Ted Dutton, Director of Publications; Kenneth A. Butts, Administrative Officer; Eleanor Dye, Art Director; William H. Matthews III, Editor, Reference Series; Robert E. Boyer, Editor, Field Study Guide Series; Robert L. Heller, Editor, Single Topic Series; Mary G. Pitchford, Staff Editor

VI. PROJECT SUPPORT:
(A) Organizational sponsorship: American Geological Institute
(B) Funding agency: National Science Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: The major objective of ESCP is to implement a philosophy of science education that emphasizes scientific inquiry and is experience-centered for the student. Biology, chemistry, mathematics, and physics are used to develop concepts and define processes in earth science. A text, laboratory manual, and teacher's guide for use in secondary school earth science courses will be developed. One or more pamphlet series, a set of visual materials, and a set of laboratory models are also planned to supplement classroom material.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Materials developed by ESCP will be interdisciplinary in nature including material from the fields of astronomy, geology, geophysics, meteorology, oceanography, and physical geography. Most of the material developed will be designed for use at the ninth-grade level, but some of the material will be usable at higher levels (grades 10-12) and some at lower levels (grades 7-8)

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:

1. ESCP Newsletters, Nos. 1-11
2. Reference Series Pamphlets: RS-1, Sources of Earth Science Information; RS-2, Selected Earth Science References; RS-3, Selected Earth Science Films; RS-4, Selected Maps and Earth Science Publications for the States and Provinces of North America; RS-5, Free Materials for Earth Science Teachers; RS-6, Planetariums, Observatories, and Earth Science Exhibits
3. Text, Investigating the Earth
4. Laboratory Manual, Investigating the Earth
5. Teacher's Guide, Investigating the Earth

X. USE OF YOUR PROJECT MATERIALS: 75 teachers using the complete program and 250 using a portion. Some specific schools using the materials: Palomares Jr. High School, Pomona, Calif.; Oberon Jr. High School, Arvada, Colo.; Robinswood Jr. High School, Orlando, Fla.; Lexington High School, Mass.; West Jr. High School, Duluth & Minnetonka East Jr. High School, Excelsior, Minn.; New Brunswick Jr. High School, N J.; Plant School, West Hartford, Conn.; Roxboro Road Jr. High School, Mattydale & Vestal Central School, N. Y.; Josephus Daniels Jr. High School & Fred J. Carnage Jr. High School, Raleigh, N. C.; Mentor High School & East Jr. High School, Maple Heights, Ohio; Hoover Jr. High School, Oklahoma City, Okla.; Ezekiel Cullen Jr. High School, Houston & St. Mark's School of Texas, Dallas, Tex.; Keithley Jr. High School, Tacoma & Butler Jr. High School, Seattle, Wash.; Ferguson High School, Newport News & W. T. Woodson High School, Fairfax County, Va.; North Central High School, Indianapolis, Ind.; Edison Jr. High School, Harrisburg & Hatboro-Horsham High School, Horsham, Pa.; Regina Dominican High School, Wilmette & Glenbrook North High School, Northbrook, Ill.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGE(S) INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. MATERIALS PRESENTLY BEING DEVELOPED:
6. A Single Topic and Field Study Guide Series of pamphlets
7. A series of 10 to 20 minute films

XIV. MATERIALS AVAILABLE FREE: No. 1

XV. MATERIALS PURCHASABLE: No. 2--$1 for set of RS-1, 2, 3 and $1 for set of RS-4, 5, and 6; Nos. 3, 4, 5--Set for $7

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Tested for second year in 75 schools (10,000 students). Feedback submitted by teachers supplemented by staff observation. The testing program consists of a Test of Science Knowledge (110 items) given at beginning of year; 5 Achievement Tests and 1 Comprehensive Final

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: ESCP summer institutes to be encouraged and aided. In-service teacher training course (12-week, 3-credit) being run.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Classroom testing of materials. Revision of materials based on feedback and visits. Preparation of films. Testing and revision of tests. Planning activities in teacher preparation.

XIX. PLANS FOR THE FUTURE: Continued activity in teacher preparation, films, and pamphlets. Commercial publication of text and lab (combined) in April, 1967

I. PROJECT TITLE: Elementary School Science Project (ESSP)

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: A. L. Braswell; Robert G. Hammond; Reed Roberts; John K. Wood. December, 1962

III. PROJECT DIRECTOR: John K. Wood

IV. PROJECT HEADQUARTERS ADDRESS: John K. Wood, Utah State University, Logan, Utah 84321

V. PROFESSIONAL STAFF: Eldora Couch, Teacher Consultant; Myrtle Dehart, Teacher Consultant; Kathy Salsbury, Teacher Consultant; Edna Taylor, Teacher Consultant

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Physics-Education, Utah State University, Logan, Utah
B. Funding agency: National Science Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: To provide lessons in basic science for elementary school children stressing methods of observing changes in the characteristics of interacting objects, and to construct and standardize a test for elementary scientific skills.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Science subjects, both physical and biological, in grades 1 and 2.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Science for the First Grade--a Teacher's manual
2. A standardized test for concept development prerequisites
3. Newsletter No. 1

X. USE OF PROJECT MATERIALS: Four trial classrooms in Hillcrest and Woodruff Schools, Logan, Utah

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None planned at present

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:
4. Science for the Second Grade--a Teacher's manual
5. Newsletter No. 2

XIV. MATERIALS AVAILABLE FREE: Nos. 3 and 5. Write to

John K. Wood, Director, E.S.S.P., Utah State University, Logan, Utah 84321

XV. MATERIALS PURCHASABLE: No. 1, $1.50; No. 2, $1.00. Request from John K. Wood, Director, E.S.S.P., Utah State University, Logan, Utah 84321

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Subjective evaluation is being made by cooperating first-grade teachers. A test to evaluate Vygotsky's "concept development prerequisites" including deliberate attention, logical memory, and ability to compare and differentiate, has been given to the first grade. These tests are now being evaluated. A test for the second grade program will be developed to test the science process skills emphasized; viz. perception of inter-relationships, communication of results of observed interaction through use of coordinates, and measurements of changes.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Summer institutes for elementary science supervisors and principals and in-service television programs for those using the program in the state of Utah are being planned.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: The first grade trial manual has been revised and reprinted. The first and second grade biological lessons have been sketched out and developed for use with trial classes. Kindergarten lessons have been sketched and several tried during summer school session. Biology lessons have been tried in the first and second grades at Hillcrest and Woodruff schools, Logan, Utah.

XIX. PLANS FOR THE FUTURE: Funds permitting, additional topics and materials will be developed:
1. Science for Second Grade, Trial Edition, available in late summer, 1966
2. Science for Kindergarten, Trial Edition, available in late summer, 1967
3. Science for Third Grade, Trial Edition, available in late summer, 1968
Writing and planning conferences will convene during the summers of 1966, 1967, and 1968 to write manuals.

I. PROJECT TITLE: The Elementary Science Project

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Joseph C. Paige. March 1964

III. PROJECT DIRECTOR: Joseph C. Paige

IV. PROJECT HEADQUARTERS ADDRESS: Departments of Education and Physics, Box 574, Howard University, Washington, D. C. 20001

V. PROFESSIONAL STAFF: Halson V. Eagleson, Associate Director; Thelma Johnson, Associate Director; Edith Calhoun, Staff Consultant (Social Work); Wanda Mitchell, Secretary; Charles Wells, Project Coordinator; E. Robert Adkins, Evaluation; Program Development: Willis Hines, Christine Raye, Josh Mack, Shirley and Garland Kearney, Leroy Daniels, Robert Wells, Emily Herring, Ann Fuller, Randolph Scott; Consultants: Mildred O. Tucker, Andrew Robinson, Freddie Banks, Allonia Gadsden, Eudora Winters, Edyth Lyons.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Howard University
B. Funding agencies: U. S. Office of Education, National Aeronautics and Space Administration (Adult Literacy), Western Electric Fund, Burns and Roe, Inc., Morris Morgenstern Foundation, Royal Crown Cola Company, The Perkin-Elmer Corporation, and Mrs. Carroll Prentice Eveleigh.

VII. SPECIFIC PURPOSES AND OBJECTIVES: (1) To develop a program of compensatory science experiences for disadvantaged children (K-6) and their parents; (2) To determine whether or not the participation in these experiences by disadvantaged children and their parents can help, in a significant way, to overcome social and personal handicaps which usually attend such privations; and (3) To discover what changes in behavior in both children and parents may result from participation in the project. In addition, The Elementary Science Project administers the National Adult Space Literacy Project under contract with the Educational Programs Division, National Aeronautics and Space Administration.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Kindergarten through sixth grade (K-6)

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION. Fifty elementary science activity kits have been produced. As examples, seventeen of the fifty titles are:

1. Air has pressure
2. Air and water
3. Changing air pressure
4. Gravity flow system
5. Heat
6. How seeds become plants
7. Metals
8. Mirrors
9. Pressure
10. Static electricity
11. Space materials
12. Sound
13. Surface tension
14. Taste
15. The magnifying glass
16. The suction cup
17. Magnets

Articles about the project have appeared in the following publications:

18. *Science Newsletter*, October, 1964
19. *Ward's Newsletter*, November, 1964
20. *Howard University Magazine*, January, 1965
21. *Science and Children*, March, 1965
22. *The Elementary Science Project: A Progress Report*, 1966

X. USE OF YOUR PROJECT MATERIALS: Ten teachers are using complete program and fifty are using portions of it. Some specific schools using the materials: Katie C. Lewis School and the East River Homes Children's Center of Mills College of Education. Cooperating Centers have been established in North Carolina, Washington, D. C., and New York City. It is emphasized that the original material was developed for enrichment purposes for use after school and in Saturday sessions.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGE(S) INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Possibly Korean (in discussion stage)

XIII. MATERIALS PRESENTLY BEING DEVELOPED: None. Performance objectives are being developed for new materials for adults

XIV. MATERIALS AVAILABLE FREE: Items 18, 19, 20, 21, and 22, Section No. IX above, available upon request

XV. MATERIALS PURCHASABLE: None. It is planned to make the kits and other materials available for sample distribution in the fall, 1966.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Special checklists have been developed for evaluations by children and their parents, area coordinators, group leaders, and staff. Pre-tests were not used in the initial evaluation. This was because of the special nature of the materials developed. Procedures are being formulated for an extended evaluation in cooperation with some of the personnel of the Institute for Developmental Studies, New York Medical College, the Institute for Youth Studies at Howard University, and the Washington Institute for Research and Experimental Studies.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Plans are tentative

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: (1) Continued testing of experimental kits and materials in cooperating centers in North Carolina, Washington, D. C., New York City, Florida, and Louisiana; (2) Materials were also tested in several urban schools and with some 4-H groups; (3) Joint sponsorship of Saturday Science Participation Sessions with the District Commissioner's Youth Council; (4) Gave assistance to agencies and groups, nationally, in the formulation of action programs for disadvantaged persons; and (5) Developed, under contract with the National Aeronautics and Space Administration, the National Adult Space Literacy Project, as a pilot effort.

XIX. PLANS FOR THE FUTURE: Further plans, including Topics, are to be announced in a special newsletter

I. PROJECT TITLE: Elementary Science Study (ESS)

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Educational Services Incorporated. 1960

III. PROJECT DIRECTOR: Charles Walcott, Assistant Professor of Biology, Tufts University, Medford, Mass.

IV. PROJECT HEADQUARTERS ADDRESS: Educational Services Incorporated, Box 415, Watertown, Mass. 02172

V. PROFESSIONAL STAFF: Elizabeth Barnett; Beth Barth; Winfield Benner; John Bigelow; Charles Botticelli; Patricia Brinson; Randolph Brown, Edith Churchill; Rose Crowley; Eleanor Duckworth; William Floyd; Donald Ford; Mary Gillmor; Frederick Gornall; Christopher Hale; Johns Hopkins; William Hull; Dalton Jones; Madison Judson; Richard Kimball; Allan Leitman; Costa Leodas; Paul Lorris; Martin Michener; Sava Morgan; Adeline Naiman; Roger Payne; Frieda Ployer; Edward Prenowitz; Lynn Sagan; Mary Lela Sherburne; Phylis Morrison; Malcolm Skolnick; Cornelia Voorhees; Charles Walcott; Marion Walter; Rosly Walter; David Webster; William Weston; Gerald Wheeler; Bernard Zubrowski.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Educational Services Incorporated
B. Funding agencies: National Science Foundation. (We are sometimes asked by teacher training or research organizations or schools to work out a program of introduction of our materials, and we have accepted small grants for such short-term efforts, e.g., Peace Corps training, Cardozo Model School District, Educational Facilities Laboratory.)

VII. SPECIFIC PURPOSES AND OBJECTIVES: Materials selected for study are: those which inherently allow for a flow of ideas originating from the curiosity of children; content which does not change, is concrete, and is divorced from technology which frequently becomes outdated; things which are fundamental, e.g., BUTTERFLIES, CELLS, GASES, KITCHEN PHYSICS, MOLDS, PLAYGROUND PHYSICS, etc. The materials developed are trial taught with children varying in intelligence, social economic background, and age. The purpose of the project is primarily that of developing more meaningful materials with little emphasis given toward development of a sequential or continuing program with specific structure as to grade level. The purpose is not to develop a national curriculum, but to supply a variety of carefully thought-out and tested materials which a curriculum director may use in developing an elementary science curriculum for the particular needs of his school system.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: See answers to IX and XIII. Note: It has been our experience that schools and teachers have used our materials in grade levels both above and below those specified. The specifications given indicate only the grade level at which most of the trial teaching has been effective.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:

1. Behavior of Mealworms (Grade 6) stimulates children to ask questions about the observable behavior of an unfamiliar animal and then directs them to ways of finding answers for themselves. Equipment: mealworms, food, containers. Printed matter: teacher's guide, two student booklets.
2. Gases and "Airs" (Grades 5-8) is an introductory unit examining some properties of gases in a series of closely linked laboratory experiments in which children analyze the interaction of air with "things" in the environment. Equipment: tubes, candles, steel wool, seeds. Printed matter: teacher's guide, worksheets. Film: one 16 mm black and white, sound, classroom film.
3. Growing Seeds (Grades K-3) is a unit in which children plant a collection of seeds and non-seeds to see which ones grow. They dig up some of the seeds to find out what happens underground. Then each student plants a new corn seed and daily cuts a strip of paper showing the height of his plant. Children find that the collection of strips can tell a lot about the way their plants grew. Equipment: seeds, soil, containers. Printed matter: teacher's guide. Film: two 8 mm loops.
4. Kitchen Physics (Grades 5-7) is a first course in science drawn from the child's environment. The student investigates the properties of common liquids

--typically water, soapy water, oil, alcohol, syrup and considers a number of questions about the behavior of these liquids which direct his attention to such attributes as the way they are absorbed, evaporate, drop, stream, and interact with various surfaces. Equipment: drip tubes of varying diameters, liquids, balances, droppers, containers. Printed matter: teacher's guide, worksheets. Film: three 8 mm film loops.

5. Small Things - An Introduction to the Microscopic World (Grade 5) introduces the child to the microscopic world, the instruments needed to make it accessible, and the differences in appearance and structure of non-living as well as living things. Equipment: microscopes, slides, stains, plants, crystals, pond cultures. Printed matter: teacher's guide, student booklet, worksheets. Film: one 16 mm, sound, color film, one 16 mm black and white, classroom, sound film, and eleven 8 mm film loops.

6. Microgardening (Grades 4-7) helps children gain familiarity with the rapid growth and the remarkable diversity of molds. Children become familiar with and readily develop pure culture procedures adequate for carrying out experiments that lead to understanding the reasoning of the great pioneers in medicine, agriculture, microbiology, and food technology. They recapture some of the excitement of the individual achievement of workers in earlier times, a hundred years ago, and they gain appreciation of the importance of molds and other micro-organisms in the great cycles of growth and decay. Equipment: containers, nutrient media. Printed matter: teacher's guide, mold handbook, cookbook. Film: seven 8 mm loops.

7. Bones (Grades 4-6) engages the students in activities with bones. They become familiar with a variety of bones, notice the similarities and differences among them, and experience the satisfaction (and frustration) of making skeletons. Equipment: disarticulated skeletons, assorted bones. Printed matter: teacher's guide, picture book, chicken skeleton book. Film: five 8 mm loops.

8. Attributes Games and Problems (Grades K-8) is concerned with the development of thinking skills in children. The subject matter is logic, but the emphasis is on developing problem-solving skills and attitudes which will be useful in a wide variety of situations. Children explore problems of classification and become skillful in dealing with the relationships between classes. These materials are designed for use from kindergarten through junior high school

by small groups of children. Older children may work directly from a set of problem cards; the teacher will introduce the various games and problems to the younger children. Equipment: blocks, loops, problem cards. Printed matter: teacher's guide, cards.

9. Batteries and Bulbs (Grades 5-8) is an introduction to the study of electricity and magnetism in the course of which children investigate such things as ways to light several bulbs with one battery, what happens when more than one battery is used, whether varying lengths and types of wire influence the brightness of bulbs, the effects different patterns of wires, bulbs, and batteries have on the brightness of bulbs. Equipment: flashlight batteries, small bulbs, various kinds of wire, compasses, magnets. Printed matter: teacher's guide (in four books).

10. Ice Cubes (Grades 5-6) deals with variations of the general question, "What makes an ice cube melt faster or slower?" Children determine how long it takes an ice cube to melt in the air and in different amounts of water. They see who can keep an ice cube the longest; they explore the melting rates of funny-shaped ice cubes and begin to develop intuitive ideas about surface-volume relations. They collect data and learn a good deal about plotting tables and graphs. Equipment: thermometers, ice, containers. Printed matter: teacher's guide.

11. Melting Ice Cubes (Grades 4-5) is an informal introduction to heat and temperature. Children are given half-inch cubes of wood and aluminum to put on ice. By putting stacks of blocks, heated blocks, and cold blocks on the ice, the children try to determine whether the difference in sinking in is caused by weight or by something else. They also melt away whole ice cubes--in air vs. in water, in lots of water vs. a little water, and in big cups vs. little cups. They also use other shapes of ice (round, flat, and crushed) and compare their melting times with cubes of equal weight. Equipment: ice, containers, blocks. Printed matter: teacher's guide.

12. Pendulums (Grades 4-6) uses a frame that supports two pendulums at a time. Working in pairs, children compare the effects of length of string, weight of bob, and amplitude. They find out how long to make the strings in order to double, triple, quadruple the pendulum's period. They study factors that make pendulums die down faster and they also add couplings between the two strings. Equipment: frame, string, bobs. Printed matter: teacher's guide.

Film: five 8 mm film loops.

13. Mystery Powders (Grades 3-4) deals with the properties of various substances and the use of indicators in detecting their presence. Students try to identify some unknown white powders by tasting, smelling, feeling, and comparing them with known substances. Additional investigations with heat, iodine, and vinegar identify specific reactions with several of the powders. To conclude, the children attempt to determine the presence of individual powders when two or more are mixed together. Equipment: sugar, salt, baking soda, starch, plaster of Paris, vinegar, iodine, heat source, containers. Printed matter: teacher's guide.

14. Mirror Cards (Grades K-5) uses mirrors and carefully designed colorful pattern cards to help children become acquainted simultaneously with some elementary geometric optics and the concepts of symmetry. Equipment: cards, mirrors. Printed matter: teacher's guide.

15. Light and Shadows (Grades K-3) is a unit in geometric optics. Children use many shapes and their own movements to examine shadows and light sources. No special equipment. Printed matter: teacher's guide.

16. Curious Gerbils is a book for children. It is a handbook on the care of these small classroom animals and also suggests some experimental questions on diet and behavior.

17. Sky Reminders (Grades 2-6) is an introduction to observational astronomy. During a period of three months the children are given approximately forty notes called Reminders. Each note describes an event that the children can see in the sky. The children's observations of the moon, sun, a bright planet, and a few easy-to-find stars are the basis of the study. No special equipment. Printed matter: printed notes (reminders), Moon Book.

18. Peas and Particles (Grades 4-6) is a series of classroom activities in counting and estimating. Starting with low numbers and progressing towards "millions and billions", the children estimate beans on a paper, rice grains in jars and others. They develop and criticize their own indirect counting methods. Equipment: rice, beans, balls, etc. Printed matter: teacher's guide, charts, set of pictures.

19. Balancing (Primary) provides some special equipment with which the child can investigate balance and weight explicitly. By working with an assortment of balances--seesaws, pan balances, equal-arm and unequal-arm balance--the child can develop increasingly sophisticated notions of balance and weight. Equipment: walk-on boards, 4-foot

boards, pan balances, things to weigh. Printed matter: teacher's guide, mobile book.

X. USE OF PROJECT MATERIALS: Since our program is not completed, we have no teachers so involved. A total of 500 teaching quantity packages of each of the first five above units have been purchased or used in workshops. 50 of each of these five were trial classes closely observed by us. For each of the 14 trial teaching editions approximately 50 trial classes of each are being supplied with materials and closely observed by us. Additional classes are also being conducted which are not so closely followed.

Since this project is not involved in developing a sequential curriculum, it is inappropriate to refer to it as a specific course. Many schools in the following communities are involved in using units developed so far: Montgomery County, Md.; Jefferson City, Colo.; Dixie School District, San Rafael, Walnut Creek, and Lompoc, Calif.; Wellesley, Watertown, and Lexington, Mass.; New York, N. Y., and environs of St. Louis, Mo.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Some informal translations into Spanish have been made for use by Peace Corps Volunteers in Colombia, South America. Arrangements for translation in the future will be undertaken by McGraw-Hill Book Company.

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:

20. Changes (Grades 1-4) begins with the children's predictions of what things change when left by themselves. They make up lists of things that they think will or will not change, and then proceed to bring these into class to verify their predictions. During the course of several weeks food becomes garbage, wet metals rust, liquids become cloudy, maggots may appear, and rocks remain rocks. From the nature and timing of these processes the children develop their own sense of biological and physical changes.

21. Desert Animals (Grades K-3) describes how three classes use desert animals (gerbils, lizards, kangaroo rats, and chuckwallas). The idea is to consider

the animals not only as pets, but to observe their behavior and gain some ideas about ecology. The children write, draw, sing, talk, care for and care about their animals. Animals would probably be studied intensively for two months. The caring for and casual observation of the animals might extend through the year.

22. Mosquito Larvae (Grade 5) is a unit in which children observe the metamorphosis of mosquitos from eggs to adults. Simple experiments are conducted to determine what environmental conditions of a swamp are favorable for the development of mosquito larvae. A supplementary reading booklet gives a variety of information on mosquitos that cannot be obtained experimentally.

23. Pattern Blocks materials (Grades K-5) are a set of blocks of wood in the shapes of regular polygons: triangles, squares, trapezoids, diamonds, hexagons, each shape painted its own color. There is a seemingly endless number of patterns and designs which can be made with these blocks, and this gives great scope for children to be inventive and fanciful. One group of problems has to do with building up large triangles or diamonds or trapezoids out of the blocks, and arithmetical questions arise as to the relation of the length of the side of the figure to the number of blocks needed. A group of elegant geometrical questions has to do with what kinds of repeating patterns can be made.

24. Pond Water (Grades 3 and up) uses as basic material the teeming plant and animal life of fresh water ponds, and gets the students to participate in following the development of representative plants and animals, bringing out the interdependence of organisms concerned and familiarizing the children with representative forms from microscopic plants and animals to the more familiar larger forms.

Study cards covering several of the important class approaches are nearing final revision. The unit starts with a trip to the pond to collect material early in the autumn. Film: 8 mm loops of several organisms.

25. Printing Press (Grades K-2) is a movable-type press on which children compose, select, type and print their work. This press can support work in all subject matter areas including science. Particularly, lower grade children are stimulated to learn to read and write and observe all through the same channel.

26. Pumping Stations (Grades K-4) consists of equipment that supports exploration in hydraulics and fluid dynamics for children ages 4 through 10. The equipment is conceived

for outdoor use and for warm weather.

27. Rates and Changes (Grades 7-8) attempts to make students aware of the commensurability of counting rates and duration of experiment. Various kinds of time units should be recognized as natural and appropriate. To utilize these in an experiment one must have some feeling for the extent of the experiment and the duration of the phenomena. A wide range of physical, chemical, and biological phenomena is used to acquaint children with processes of different rate and of various duration. Film: 8 mm loops of some phenomena.

28. Samples and Charts (Grades 3-5) is a unit in which each pair of children has a set of twenty rocks. The children establish ways of comparing these rocks and set their own standards to define certain properties, such as hard and soft, and heavy and light. They make charts telling the rocks' characteristics, and then exchange the charts to see if they can read each other's.

29. Sand (Grades K-2) is a unit using colored sand which, appealing aesthetically, invites a wide variety of explorations of a scientific nature. Sand can be thought of as analogous to water. It can be poured, measured, and dripped. It can be also contrasted with liquids: piled, looked at through a hand lens, rolled down various surfaces, strained, and massed. They make sand clocks, sandpaper, sand sculpture, and sand pendulums. Sand is seen as a material for primary classrooms which would invite children to explore it, write about it, use it as an art medium, and in various ways use it to interrelate many aspects of their school day.

30. Silk Screen Printing (Grades K-2) uses a silk screen mimeograph-type press to support classroom activities of children. The inexpensive stencils make it possible for any kind of drawing and written work of the children to be reproduced.

31. Measuring (Grades K-3) uses assorted straight edges and wheels, some of which do in fact measure the same length as a ruler, yardstick, meter, and various divisions of these standard units. These materials have no units marked on them. It is expected that the children will quickly learn which measuring device is appropriate to his task. Skills of estimating spatial and linear relationships and transposing from one unit to another without ever naming those units should help the children gain a sound basis for using standard units of linear measurement.

32. How Does the Moth Get Out? is a booklet that will be

read by students (Grades 5-6) while studying Behavior of Mealworms. It describes a research project of Dr. Fotis Kafatos which was to find how the Chinese Oak Silk Moth escapes from its cocoon. A series of observations and experiments gave the answer: this moth uses an ingenious chemical mechanism to accomplish its escape.

33. Owls is a student (Grades 5-6) booklet to be read in conjunction with Behavior of Mealworms. This is a direct account written by a scientist of his own research in animal behavior that might give children some feeling for how such research is carried out. Owls describes experiments that showed how an owl can locate its prey by homing on the sounds produced by the prey. This leads to considerations of an owl's accuracy in locating mice by hearing and to the behavior of owls that increases their chances of catching mice which they cannot see.

34. Butterflies (Grades 1-4) provides fertile eggs of the Black swallowtail butterfly in the classroom. Students and teachers raise these animals through larval and pupal stages until the adult butterflies emerge. These butterflies can then be mated, fertile eggs produced, and the cycle repeated. A 17-minute film on the life cycle of the butterfly will be available.

35. Heat and Temperature is a group of units (Grades 5-7) which will eventually evolve in the area of heat and heat phenomena. The developmental teaching is concerned with problems of heat transfer and loss using various heat sources and materials.

36. How Thick is a Soap Bubble (Grades 6-8) is a series of laboratory exercises with sticks, strings, paper, tape, discs, spheres, and others used to teach the concepts of linear area and volume measurement, and their relation to each other. Several laboratory applications of area/volume relations are considered. Finally the students are able to compute the volume of a small amount of soap liquid in a capillary tube. From this, if they blow a soap bubble so that it breaks on a desk top leaving a wet surface, they can then compute the thickness of the coap bubble from their measurement of its diameter combined with their previous knowledge of the volume of soap used.

37. Marine Life (Grades 3-6) offers children an opportunity for first-hand study of live marine organisms in the classroom. ESS is attempting to assemble an inexpensive aquarium (utilizing commercial salt formulae) that will be cheap enough to be practical and a collection of organisms that

will survive for a considerable period of time under classroom conditions. Much of what children learn about the sea animals occurs as they watch them and feed them. In addition to these rather casual observations, experiments are performed to determine the response of the organisms to changes in environmental conditions and to other artificial stimuli.

38. Budding Twigs (Grade 6) observes the first budding of a large collection of twigs. Water supply, light, temperature, length of twig, position of bud, and other such possible growth factors are considered.

39. Brine Shrimp (Grades 4-7) are tiny desert arthropods, whose eggs remain viable when dried. There are a number of meaningful questions that children can explore with brine shrimp. For example: Do brine shrimp eggs hatch faster in salt water than in fresh? How do the reactions of brine shrimp toward light change as they grow older? What is their rate of swimming? Because it is so easy to raise hundreds of these animals, statistical answers to many behavioral questions can be found.

40. Checkerboard (Grade 4) offers students large (11 inch diameter) styrofoam discs to use as "checkers". They design a checkerboard to scale, solving problems of standardized units and geometric dimensions as they do so. Subsequently they take one square as a whole checkerboard and design and scale a suitable checker for it. They repeat this process once more, scaling down one square of this second checkerboard to a miniature board and checker of suitable dimensions. There are interesting exponential relationships between the three side-lengths, the three board areas, and the three checker volumes. In the course of playing games on these three boards the need for the formation of coordinate systems on the smallest and largest becomes apparent in order for opposing players to be able to exchange information.

41. Clay Boats (Grades 3-5) is an attempt to acquaint children with some of the problems associated with buoyancy, density, and volume displacement in liquid. Children are given lumps of clay and asked to see if they can make them sink or float. Eventually children form the clay into boatlike shapes and discover the properties associated with various shapes, sizes, thicknesses, and weights. This activity is related to other activities dealing with buoyancy, displacement, and fluid phenomena.

42. Expansion and Contraction (Grades 5-6) attempts to

acquaint children with the phenomena of heat transfer and change of bulk as a function of heat absorption by metals and other substances. Children are given simple devices which contain heat sources and metallic samples to be tested. They explore the change of length of rods, the change of area of plates, and the change of volume of bulk samples as heated. The devices with which they work combine the capacity for the performance of the experiment with graphical techniques that allow the children to utilize the data they receive almost immediately.

43. Frog Eggs and Tadpoles (Grades 3 and up) examines the natural development from the fertilized egg to the adult frog under classroom conditions. The care and fostering of the animals and the total development of the frog, from fertilized egg to froglet, requires only a few minutes observation and handling each day plus an occasional period for discussion and summary. Films: one 17 min., 16 mm silent, color film and seven 8 mm film loops.

44. Geometric Blocks (Grades K-5) were designed to provide children with a number of concrete experiences which can be related to the more strictly academic subject matter, such as geometric relations, linear, area, and volume measurement and equivalents and others. A wide variety of shapes and sizes is provided to stimulate expressive building and imaginative visualization of more detailed problems.

45. Dipping Birds (Grades 5-8) capitalizes on some of the other phenomena which have been brought out in another unit, Kitchen Physics. The phenomena are absorption, capillarity, and the equilibrium which may be reached between these processes in blotters and other absorbent material. The dipping bird is constructed of a piece of blotter which is then weighted so that the whole bird will function as a scale or balance. Many avenues of investigation are opened by allowing children to experiment with the size, the shape, and the fluid into which the bird is dipped; the way in which it is suspended; the temperature; the relative humidity in the room; and the amoung of air blowing past the bird.

46. Earthworms (Grades 4-7) is one of a group of activities entitled Biological Environments. These activities offer children the opportunity to uncover various relationships between an organism and the environment through experiments which evaluate the organisms's response to a choice of environmental factors. In this unit children learn something of the behavior and biology of earthworms on a statistical

basis by placing them in inexpensive plastic "choice" tubes. Various different conditions are established at either end of the tubes, e.g., dry sand vs. damp humus, light vs. dark. The children insert earthworms into the tubes at midpoint and observe preferences when given a choice of conditions.
47. Euglena (Grades 6-8) is a unit in which children are challenged to grow Euglena, eventually by themselves, in sterile culture. The activities are organized around questions such as: How do they reproduce? How fast do they grow? Are they plants or animals? Do cultures always die out? Why?
48. Counting to the Slide Rule (Grades 7-8) is designed to make students aware of the possibilities of estimating and approximating large numbers and leads to the ideas of exponential notation and order-of-magnitude scales. The work with order-of-magnitude scales and comparison of them with the ordinary number line scales lead to a description of some experimental results in logarithmic rather than linear terms. The students arrange these results on a scale and find out that the order of magnitude or logarithmic spacing that accompanies their computations can be used in multiplicative and divisive ways for computation. Students are given semi-logarithmic paper patterned in strips, and they construct their own slide rules. After they have gained some practice with these they are given inexpensive plastic slide rules which they then use in much of their other work.
49. Crayfish (Grades 5-6) uses the common, readily available crayfish as a typical representative of the fresh water environment and yields to the students an understanding of the feeding habits, reaction and relations to the environment of these animals which are readily managed, maintained, and observed in the classroom.
50. Fiddleboard (Grades K-2) uses composition board, push pins, strings, straws, elastic bands, paper clips, various weights and pulleys. A great variety of constructions, models, bits of equipment are possible, and the material is so flexible that plans can be modified as they are being executed and readily changed from day to day. Many of the things children make are the result of happy accidents which they recognize as they are working on something else or just fiddling around; they gain a feeling of competence about inventing devices for a particular purpose; they learn quite a bit about elementary mechanics, linkages, structures, and motion.
51. M Blocks (Grades K-2) are really measurement blocks.

They are a conscious attempt to free some of the earlier ideas related to Cuisenaire rods and measurements; they are constructed with wider variations in length, breadth, and width, and are based upon some rational cell unit of the meter or the yard. Their use is intended to acquaint children with measurement processes and the ideas associated with the use of many units.

52. Metallurgy is an attempt to get at some ideas associated with bulk properties of metals: density, hardness, bulk modulus, torsion modulus, and others. The children are able to construct very simple equipment to test elastic strength, crystalline properties, and other physical attributes.

53. Optics (Grades 6-8) is aimed at acquainting children with the ideas of refraction and diffraction, lenses and optical instruments, and tests of variations of optical path using different optical density materials: water, colored water, oil, glass, and other. The introduction of diffraction phenomena really comes by examining shadows cast by various lenses and noting some of the dramatic aberrations. Very inexpensive, simple, collimated light sources have been designed, and optical benches or the equivalent which will allow a number of children to experiment readily are being completed. These benches are adaptable to a wide range of use--they may be set up on the floor or large tables or taken in sub-assemblies by an individual child so that he may experiment by himself.

54. Shadows (Grades 3-5) examines the recognition of two-dimensional shapes when we see them at an angle because of various clues. Our experience indicates that learning to understand such projections can proceed quite rapidly if students are allowed to move an object freely with their hands as they try to achieve various projections. A shadow box with appropriate equipment and problems can bring out the complexity of visual discriminations and yet make the problem manageable. Preliminary work with such problems as two-dimensional geometric shapes has gone on to the projections of solids. One problem would be to hold a cube at such an angle that its projection is a regular hexagon. Another problem is to model a shape out of plasticine such that the front projection is a circle, the side projection a triangle, and the top projection a square. Our expectation is that experience with such problems using rather simple apparatus, may lead to greater skill in visualization.

55. Activity Wheels (Grades 2-5) are exercise wheels for

small animals to which are attached counters to measure the number of turns the wheel makes. Using an activity wheel, it is possible to gather data on the activity of animals under varying conditions. Some of the factors that can be tested are the effect on activity of: hunger, age, size of cage, noise, light and dark, number of animals, and type of animal.

56. The Astronomy Units are a group of activities (Grades 5-8) proposed for this subject.

Distance Measurements - the class probes the sky by launching helium-filled toy balloons. They distinguish some features of the sky--clouds, planes, birds, balloons--from sun, moon, stars. The loss of usual cues stimulates use of geometric means to follow and measure balloon flight by range-finders.

The Orion Book - this is a book of photographs for children. It shows many of the sky phenomena--planets, satellites, the ecliptic, the moon, nebulae, even galaxies--all in relationship to that familiar landmark, Orion. It has Orion on old star charts, showing that the constellation was seen at places far distant in time and space. The children learn to learn from photographic evidence, a little like real astronomers.

Future plans include work on sun dials; serial photographs of the sky; measuring the distance to the moon; learning to use, as well as make, tables of astronomical data; exploring the possibility of going from models to sky observations and back again.

57. Balancing (Grades 4-7) is a unit in which children hang washers on strips of peg board suspended from a nail. They learn how to identify problems involving balance and to make use of various strategies to solve the problems. An intuitive understanding of moments of force and center of mass underlie the study.

58. Structures (Grades 3-7) is a unit dependent upon children leisurely working with materials to their structural limits. As the children build with materials (newspaper, clay, sticks, scotch tape, and others), they begin to see the relationship between material, function, and form. By slowly working with a set of various materials, a wide range of experience is provided.

59. Bending Plants (Grades 4-6) deals with the responses of oat seedlings to light and gravity. Children do experiments to establish changes in direction of growth of stem and roots and the rate at which they occur under controlled

conditions. All of the experiments can be done with tin cans, baking dishes, sand, plastic soda straws, tackiwax, and a 2"x2" stick 6 inches long.

60. Play Frames (Grades K-2) is a piece of equipment that provides opportunities for both mechanical and dramatic play within the classroom.

61. Snowflakes (Grades 4-6) uses a recently developed technique of obtaining replicas of snow flakes which are caught as they fall on special plastic cement. It has been successfully carried through one winter in schools. The basic structure of snow crystals, the exquisite beauty and symmetrical pattern of the several different types which are the result of atmospheric conditions at high altitudes give the students an appreciation of the diversity of patterns and foster reproducing these by paper cutouts and other means.

62. Thermometry (Grades 4-6) is an attempt to acquaint children with a wide variety of instruments that can measure changes in temperature: metals expanding, bi-metallic strips, color-change thermometers, liquid and gas expansion thermometers, are some of the kinds that are introduced. Children begin by experimenting with their fingers in hot and cold water and then look at ice cubes and sugar melting or dissolving into solution. They invent thermometers using principles they have learned from experimentation with bimetallic strips. They look at various chemical thermometers, principally those where they observe the melting of various organic salts.

63. Time and Clocks (Grades 3-5) is a sub-unit associated with Rates and Changes. Children make various kinds of counting and time-keeping instruments. Sand clocks, water clocks, vibrating clocks, and oscillating clocks are all useful in giving some sense of time and its span.

64. Bubble Boxes (Grades K-2) are sealed plastic containers with compartments. Colored water can be poured from one compartment to another, and it takes on different shapes within the container. No water is added or removed and yet the amount of water looks very different in one orientation of the container than in another. We have called these containers "bubble boxes", because we have found that the addition of detergent and/or metal particles adds greatly to the appeal of this bit of equipment. Bubbles and soap films are formed as the liquid is poured from one section of the box to another and the currents and displacements can be seen as the liquid is moving. The interaction between air and liquid in this closed container is interest-

ing to observe and difficult to predict.

65. Chemistry (Grade 7) closely examines four chemicals: baking soda, baking powder, vinegar, and water. Students consider the volumes of gas produced by specific volumes of materials whose reaction is allowed to go to completion. They consider which of the reacting substances needs to be added for the reaction to continue. They also do quantitative experiments controlling the end results (volume of gas produced). A new set of materials, magnesium ribbon and 5% hydrochloric acid, then provide them with a chance to compare their experience with another reaction which is both similar and different in terms of volume of gas produced, end of reaction, and the properties of the resulting gas.

66. Chemistry - Metals (Grades 5-6) is a generalized look at the way common metals react to other common substances. Metals in gases and metals in liquids react specifically and differently with especially interesting phenomena visible at the boundary between a liquid and a gas, e.g., aluminum partially submerged in a solution of common household detergent.

67. Color (Grades 4-6) includes a number of experiments. By looking at different colored papers through colored lucite, the change and extinction of certain colors can be seen. Several methods are used to mix colors, including the use of colored lights and the mixing of dyes and paints, and colored shadows are created.

68. Construction Materials (Grades K-3) provides a set of construction materials which make possible the construction of buildings, imaginative designs, or models of real buildings. The set has in its possibilities the potential use for expressive purposes, such as those commonly held to be in the domain of art, as well as active investigations, such as crane construction, bridge building, or dynamic moving interrelationships such as pulleys, gears, belts, etc. The set will include day-to-day use, such as making from its parts aquarium frames, pendulum frames, balances or storage bins.

69. Duckweed (Grades 3 and up) may be studied as an experimental outgrowth of the Pond Water unit. This plant is large enough to be observed without magnification, but small enough to grow rapidly and noticeably within a few days. Tap water kills it quickly; distilled water keeps it alive for a week, but soil water allows it to grow (given plenty of light) for several months. It is easy to

try different mineral salts to grow the duckweed, and some of the basic properties of plant nutrition emerge.

XIV. MATERIALS AVAILABLE FREE: Approximately 50 copies of each unit with the materials necessary to teach a class are supplied free to schools selected for trial teaching. Schools wishing to volunteer to be used in this way should address their requests to: Trial Teaching, Elementary Science Study, Box 415, Watertown, Mass. Reprints of several magazine articles describing the work of this project are available and given out free of charge. Also a regular Newsletter is published and sent to a mailing list of about 8,500. Upon request, interested institutions, scientists, or educators are added to this mailing list.

XV. MATERIALS PURCHASABLE: The first five above listed units will be available from McGraw-Hill Book Company beginning in September 1966 at a cost to be determined. Trial Teaching Editions as they become available are purchasable as long as the limited supply lasts.

6. Microgardening	
Teacher's Guide	$ 2.50
Cook Book	1.00
Handbook	3.00
Classroom kit (for 30 students)- not available in present edition	145.00
7. Bones	
Teacher's Guide	2.00
Chicken Skeleton	.75
Picture Book	1.00
8. Attribute Games and Problems	
Teacher's Guide	2.00
Set of materials	5.00
9. Batteries and Bulbs	
Book 1 - Circuits I	2.00
Book 2 - Circuits and Magnets	1.00
Book 3 - Circuits II	1.00
Book 4 - Guide to Books	.50
Classroom kit (for 30 students)	83.00
10. Ice Cubes	
Teacher's Guide	.75
11. Melting Ice Cubes	
Teacher's Guide	1.00
12. Pendulums	
Teacher's Guide	1.00

12. Pendulums (cont'd)	
Kit (details not available at time this report was prepared)	----
13. Mystery Powders	
Teacher's Guide	$ .50
14. Mirror Cards	
Teacher's Guide	.50
Mirror Cards with Mirrors	5.50
15. Light and Shadows	
Teacher's Guide	.50
16. Curious Gerbils	
Booklet (children's)	1.00
17. Sky Reminders	
Moon Book (Guide)	1.00
Reminders	.35
18. Peas and Particles	
Teacher's Guide	1.00
Classroom packet of pictures and guide	2.00
19. Balancing (Primary)	
Teacher's Guide	1.50
Mobile Book	.50
Kit (details not available at time this report was prepared)	----
FILMS - Technicolor Projector	72.50
Gases and "Airs" in The Classroom - 16mm, sound, black and white (for teachers)	126.00
Paramecium, Euglena, & Amoeba - 16mm, sound, color	129.00
Frog Development - Fertilization to Hatching - silent, 16mm, 12 minutes, color	120.00
Butterfly Life Cycle (probable availability date Sept. 1)	----

Loops - All film loops are 8mm in cartridge for use with technicolor projector. They are 3 to 4 minutes in length. All of the above are in color with the exception of the Bones loops, hence the price difference.

Gases & "Airs"	
ES-1 Candle Burning Techniques	6.00
ES-2 Candle Burning I	6.00
ES-3 Candle Burning II	6.00
ES-4 The Mouse and the Candle	6.00
Kitchen Physics	
ES-5 Beading of A Water Column	6.00

Loops (cont'd)

Growing Seeds	
ES-6 Plant Growth-Graphing	$ 6.00
ES-7 Bean Sprouts	6.00
Small Things	
ES-8 Paramecium	6.00
ES-9 Euglena	6.00
ES-10 Amoeba	6.00
ES-11 Budding of Yeast Cells	6.00
ES-12 Blepharisma	6.00
ES-13 Stentor	6.00
ES-14 Rotifer	6.00
ES-15 Vorticella	6.00
ES-16 Volvox	6.00
ES-17 Stylonychia	6.00
ES-29 Comparative Sizes of Microscopic Animals	6.00
Microgardening	
ES-21 Alternaria	6.00
ES-22 Rhizopus	6.00
ES-23 Fusarium	6.00
ES-24 Penicillium	6.00
ES-25 Trichoderma Growth Rings	6.00
ES-26 Rotting Pear	6.00
ES-30 Mushroom Growth and Reaction	6.00
Bones (probable availability date June 1)	
ES-32 X-Ray Motion Pictures -Head and Neck	4.50
ES-33 X-Ray Motion Pictures - Shoulder	4.50
ES-34 X-Ray Motion Pictures - Knee and Elbow	4.50
ES-35 X-Ray Motion Pictures - Hand	4.50
ES-36 X-Ray Motion Pictures - Foot	4.50
Frog Eggs and Tadpoles (probable availability date Sept. 1)	
ES-18 Frog Egg I: First Cell Division to Early Neural Fold	6.00
ES-19 Frog Egg II: Development of The Body Regions	6.00
ES-20 Frog Egg III: Continued Development to Hatching	6.00
ES-37 Frogs: Pairing and Egg Laying	6.00
ES-38 Artificial Fertilization of Frog Eggs	6.00
ES-39 Frogs: Pituitary Preparation	6.00
ES-40 Preparation for Time-Lapse Photography of a Frog Egg	6.00

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: The 50 teachers for each of the units produced so far have made, or are making, periodic reports regarding the effectiveness of these materials with children in their classes. ESS staff members visit as many of these classes as feasible. Questionnaires are circulated. This feedback information is used both for evaluation of the unit and for its revision.

We are not involved in evaluating these materials through objective testing since we believe that the validity of currently available instruments with such a manipulative classroom experience as this is questionable. We have examined other kinds of studies and have begun to make arrangements with people undertaking research programs to concern themselves with the design of evaluative instruments for our work.

In the development of Elementary Science Study units, trial teaching has paralleled the writing and development of these units; consequently, ESS materials have undergone extensive evaluation before widespread introduction in elementary schools.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: A number of communities have undertaken their own programs in the training of teachers of elementary science. In most cases, on our recommendation, these programs have included the work of other national programs as well as the ESS materials. Usually these are conducted as demonstration schools with a group of anywhere from 30-100 teachers (sometimes as part of a course in a local university) participating as observers, exemplary teachers, and seminar members. During the summer of 1966 such programs are being conducted in Monterey County, Calif.; Cardozo Model School District, Washington, D. C.; Greece, N. Y.; Abington, Pa., and Webster College, Webster Groves, Mo., among others.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT:

1. Revision of the first five units based on feedback from teachers has been completed and they are released to McGraw-Hill Book Company for publication;
2. Preliminary publication of 14 trial teaching editions (nos. 6-19 above) which were extensively

taught while they were in the developmental process prior to this publication;
3. Initiation of 15 units now in advanced stages of development;
4. A summer workshop in 1965 in the Cardozo Model School District was conducted with the support of O.E.O.;
5. Teacher training of a group of 60 Peace Corps Volunteers for Colombia under the auspices of Brandeis University during the summer of 1965;
6. 1965 summer school for 150 children in Cambridge, Mass., used as demonstration and development school for augmented summer staff;
7. Support with materials or workshop leaders to schools and school systems as requested, averaging 3-5 per month;
8. Completion of film loop series as follows: 11 on microorganisms, 7 on fungi, 5 X-ray motion pictures of human bones. Films: Frog Development--Fertilization through Hatching, The Life Cycle of a Butterfly. Information on the above and other parts of film program may be requested by writing to: Films: Elementary Science Study, Box 415, Watertown, Mass.

XIX: PLANS FOR THE FUTURE:
1. Completion for preliminary publication of trial teaching editions of 15 units during the year 1966-67;
2. Revision based on feedback of existing 14 trial teaching editions followed by commercial release;
3. Continuing initiation of new development;
4. Summer workshop with Cardozo Model School District to provide continuing training of teachers in elementary science;
5. Two summer demonstration schools in Cambridge to provide trial classrooms for development and realistic workshop situations for Peace Corps group;
6. Two Peace Corps programs for the training of teachers--one for the Philippines in elementary science and the other for Ethiopia in secondary math and science beginning at about grade 6;
7. Experimental on-the-site film of classrooms.

I. PROJECT TITLE: Engineering Concepts Curriculum Project (ECCP)

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: E. E. David, Jr. November, 1963

III. PROJECT DIRECTORS: E.E. David, Jr., and J. G. Truxal

IV. PROJECT HEADQUARTERS ADDRESS: Commission on Engineering Education, 1501 New Hampshire Ave., N. W., Washington, D. C. 20036

V. PROFESSIONAL STAFF: E. E. David, Jr., Co-Director; J. G. Truxal, Co-Director; B. A. Sachs, Associate Director; E. J. Piel, Associate Director; M. Brotherton, Staff Assistant

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Commission on Engineering Education
B. Funding agency: National Science Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: To acquaint high school students with technical principles so that they may have an understanding of man-made systems and engineering concepts.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Logic and Computers; Sensing and Models; Energy, Control and Design. Eleventh and Twelfth grade level.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Preliminary text entitled THE MAN-MADE WORLD
2. Teachers' Manual
3. Laboratory Experiments
4. Laboratory Equipment for classes

X. USE OF PROJECT MATERIALS: Twenty-nine teachers are using the complete program. Specific schools where materials are used: Brooklyn Technical High School, Brooklyn, N. Y.; Glen Rock High School, Glen Rock, N. J.; James Caldwell High School, West Caldwell, N. J.; Staples High School, Westport, Conn.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Work on materials listed in IX.

XIV. MATERIALS AVAILABLE FREE: None

XV. MATERIALS PURCHASABLE: None

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Monthly "feedback" meetings of teachers using the materials are being held.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: ECCP teacher orientation program, University of Colorado, Boulder, July 11-Aug. 19, 1966.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE:
1. Revision of pilot textbook: Summer, 1966
2. Expanded trial from 5 to 23 new schools starting September, 1966
3. Further revision of textbook, Summer, 1967
4. Teacher orientation, Summer, 1967

I. PROJECT TITLE: Florida State University Junior High School Science Curriculum Writing Project

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: Ernest Burkman and J. Stanley Marshall. 1963

III. PROJECT DIRECTOR: Ernest Burkman

IV. PROJECT HEADQUARTERS ADDRESS: Department of Science Education, Florida State University, Tallahassee, Florida

V. PROFESSIONAL STAFF: To be selected if funding application is successful

VI. PROJECT SUPPORT: Locally supported to date. Currently seeking federal funding

VII. SPECIFIC PURPOSES AND OBJECTIVES: To develop and evaluate a comprehensive science sequence for grades seven through nine utilizing concurrent development of process and content themes.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: The tentative topics are as follows: seventh grade materials culminating in an operational definition for energy; eithth grade materials centering upon model building, and the structure of matter; ninth grade materials centering upon the total investigative process, and selected areas of the earth and biological sciences

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. "Pondering Pushes and Pulls". A three month segment of materials for seventh grade students which deals with the basic nature of forces.

X. USE OF YOUR PROJECT MATERIALS: Six teachers are using the complete program. Some specific schools where materials are used: Sarasota, Brookside Jr. High School

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGE(S) INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None

XIII. MATERIALS PRESENTLY BEING DEVELOPED:
2. Eighth grade materials dealing with the structure of matter
3. Extension of (1) above (see IX) to include

acceleration, forms of energy and interconversions of forms of energy.

XIV. MATERIALS AVAILABLE FREE: None, as yet

XV. MATERIALS PURCHASABLE: None, as yet

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Field testing and revision. Analysis of individual student responses on each step of the curricular structure through utilization of computer presentation methods. Currently using locally made tests with process and content subtests results being correlated with various aptitude measures, particularly reading sources.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: None, as yet

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported

XIX. PLANS FOR THE FUTURE: If funding is obtained, writing conferences will be held for the next five summers. The academic years will be used for tryout and evaluation.

I. PROJECT TITLE: Geometry Course for Prospective High School Teachers

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Seymour Schuster. January, 1964

III. PROJECT DIRECTOR: Seymour Schuster

IV. PROJECT HEADQUARTERS ADDRESS: Minnemath Center,
720 Washington Avenue, S. E., Minneapolis, Minn.
55414

V. PROFESSIONAL STAFF: H. S. M. Coxeter (Mathematician); Joseph D. E. Konhauser (Mathematician); Daniel Pedoe (Mathematician); Seymour Schuster (Mathematician); Allen Downs (Director of Films)

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Minnesota School Mathematics and Science Center
B. Funding agency: National Science Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: The College Geometry Course Project is devoted to the production of a one-year college geometry course for the pre-service training of high school teachers. The aim is to produce a self-teaching course--one that may be utilized by schools that are understaffed or that have inadequately trained staff--to offer prospective teachers a strong course that meets the recommendations of the Committee on the Undergraduate Program of the Mathematical Association of America. The intent is to explore the use of various media, particularly animated films and programmed instruction, and to present each topic via the most appropriate medium or combination of media.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: College geometry at the junior-senior level--particularly for secondary mathematics education students.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
Foundations)
Elementary Geometric Transformations)
Area and Volume) semi-programmed book
Non-Euclidean Geometry)
Convexity and Combinatorial Geometry)

Orthogonal Projection (12-min. animated color film + pamphlet)
Dihedral Kaleidoscopes (12-min. animated color film + pamphlet)
Triangles and Their Medians (film-strip + explanatory pamphlet)

X. USE OF PROJECT MATERIALS: 15 teachers are using some of the materials at such colleges as: University of Minnesota; Macalester College; Carleton College; Mt. St. Scholastica, Atchison, Kan.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Additional semi-programmed material in geometry, films and film-strips and an adaptation for use in high schools.

XIV. MATERIALS AVAILABLE FREE: The semi-programmed materials can be obtained free by writing to the Project Director, provided these materials will be used as part of field-testing. The films can be obtained free of charge for viewing by any audience of mathematicians or mathematics students.

XV. MATERIALS PURCHASABLE: None

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Tests are being run on target audiences. The semi-programmed material is being analyzed by mathematicians and educational psychologists. The student responses are indicating paths for revision. Examinations are also being analyzed. The films and film-strips are being tested by questionnaire methods and informal responses.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: The project intends to develop materials that can be used for independent study; consequently, there is no specific effort in the direction of teacher preparation. It is hoped that the materials themselves will be used by teachers for their own enrichment.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: By September, 1968, it is planned that 12 semi-programmed books will be ready for publication. These books will include various topics in geometry. Also, it is expected that approximately 25 geometry films will be completed by that date.

I. PROJECT TITLE: Harvard Project Physics

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: Gerald Holton; Fletcher G. Watson, and F. James Rutherford. July, 1964

III. PROJECT DIRECTOR: F. James Rutherford, Project Coordinator

IV. PROJECT HEADQUARTERS ADDRESS: Pierce Hall, Harvard University, Cambridge, Mass. 02139

V. PROFESSIONAL STAFF: Andrew Ahlgren*; Stephen Brush; Michael Butler; Robert Chesley; David Clarke; Elsa Dorfman; Walter Eppenstein; Thomas Ferguson; Robert Gardner; Fred Geis*; Owen J. Gingerich; Albert Gregory; John Harris; Peter Heller; Gerald Holton; Harald Jenson; Irving Kaplan; Alfred Leitner; Joseph Novak*; Jacques Parent; Costas Papaliolios; Nickerson Rogers; F. James Rutherford; William Shurcliff; Derwin Stevens*; Fletcher Watson; Wayne Welch; Sheldon White (*Part-time employee)

VI. PROJECT SUPPORT:
A. Organizational sponsorship: None listed
B. Funding agencies: U. S. Office of Education; National Science Foundation; Carnegie Corporation; Sloan Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: To develop a physics course for secondary schools that will appeal to a wide variety of students, from the science-oriented to the science-shy, and above all, to the large and growing fraction of students who are now taking no physics course at all in their senior high school years.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Introductory physics for senior high school

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Six text units
2. Four Programmed Instruction booklets
3. 12 test booklets
4. Six sets of Teacher Guide notes
5. Lab and demonstration apparatus
6. 36 lab experiments
7. Transparencies for overhead projector
8. Film loops

X. USE OF PROJECT MATERIALS: Sixteen teachers are using the complete program. Specific schools where materials are used: Lowell High School, Whittier, Calif.; Capuchino High School, San Bruno, Calif.; University High School, Bloomington, Ind.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None yet, but eventually there will be translations.

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Revisions of all of the above, plus additional loops, labs, transparencies, etc.

XIV. MATERIALS AVAILABLE FREE: Newsletters free upon request to News Editor, Harvard Project Physics, Pierce Hall, Harvard University, Cambridge, Mass. 02139

XV. MATERIALS PURCHASABLE: None

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Our current efforts in evaluation are directed toward the development of test instruments for use in the next two and one-half years, and for long-range evaluation. We have been making a gradual transition from evaluation directed toward course improvement to evaluation directed toward consumer information.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: During the summer of 1966 about forty teachers selected to give the course for the first time the following academic year, will attend a six-week training program at a Project Physics Summer Institute at Pomona College, Clairmont, Calif.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: During the academic year 1965-66, eight feedback conferences (six in Cambridge and two in regional centers) were scheduled. The purpose of these sessions was to assess each component of the course and to get suggestions for further revision of course materials. Another series of these useful conferences is planned for 1966-67.

XIX. PLANS FOR THE FUTURE: Newsletters, free upon request, will provide this information.

I. PROJECT TITLE: High School Geography Project of the Association of American Geographers

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: Joint Committee on Education of the National Council for Geographic Education and the Association of American Geographers. 1961

III. PROJECT DIRECTOR: Nicholas Helburn

IV. PROJECT HEADQUARTERS ADDRESS: University of Colorado, Boulder, Colo. 80302

V. PROFESSIONAL STAFF: Nicholas Helburn, Director; George Vuicich, Assistant Director; Richard Keppel, Liaison Geographer; G. E. Burks, Senior Editor

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Association of American Geographers
B. Funding agency: National Science Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: To develop teaching materials for tenth grade geography classes--materials that represent current geographic thought and research. The Project is currently developing one course, based on a Settlement Theme. Writing and school trial activities are carried on at various centers around the nation. Another course, on a regional theme, will be begun in 1966-67. In addition, the Project is developing a reference series, and will publish a book of outlines.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Geography--9th or 10th grade

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. A unit on Urban Geography: Intracity Analysis is not in final form but is available in provisional form.
2. A unit on Fresh Water Resources is undergoing revision.

X. USE OF PROJECT MATERIALS: Complete program is not yet available. The individual units are taught in the author's local area. Formal school tryouts will begin in the fall of 1966.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:

3. Unit on Intercity Analysis is ready for limited school trials.
4. Unit on Manufacturing is ready for limited school trials.
5. Unit on Political Geography is ready for limited school trials.
6. Please see Newsletter--other units not yet begun.

XIV. MATERIALS AVAILABLE FREE: Subscription to the Newsletter of the HSGP is free upon request to the Project Office. Limited numbers of copies of the Advisory Paper are available.

XV. MATERIALS PURCHASABLE: Item 1, the Intra-urban unit, is available for classroom use at a cost of $130 per class. A sample unit--without multiple copies of student materials, is $110.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: All units undergo three types of school trials. Some units may undergo trials of a single type more than once. Informal trials are carried on in the author's local area. Limited trials and national trials are carried on at various centers through the nation. The Project has so far used a pre-post test system for the units, the tests being identical. Evaluation of the test results is done by Educational Testing Service of Princeton, N. J. ETS reports to the author and the Project, providing a basis for revision. Several criteria are of interest in selecting schools. While informal trials are only in 5-7 schools, limited trials are in 48-70 schools, selected on the basis of amount of teacher training, location, rural-urban characteristics of the community, etc.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: In 1966-67, the Project will experiment with teacher training in the limited trial situation. One-third of the teachers will be experienced in teaching HSGP materials, 1/3 will receive a 1-week orientation and training program, while the remaining 1/3 will receive no HSGP training. This pilot study will provide us with information about the effectiveness of specific HSGP training. Another experiment of this type might be conducted in the 1967-68 national school trials. The Project tentatively plans to include a teacher training program as an integral part of the final Settlement Theme course package, so that all teachers would receive it.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: The Intra-urban and Fresh Water units were completed, along with Structure of the Discipline materials. Limited school trials were held on all or part of these units. A complete roster of unit authors was recruited. Initial creative work was done on the Intercity, Manufacturing, and Political units, and informal school trials held on them. The Project is now preparing for an editing conference that will tie these five units together, along with an introductory unit, for limited school trials 1966-67. Reference volume committees were selected.

XIX. PLANS FOR THE FUTURE: Limited school trials for 1966-67 will be carried on from Sept. 1966 through May, 1967. Unit authors will complete, before May, 1967, the initial creative work and informal trials on the remaining units of the course: Agriculture, Culture Change, Habitat, and Japan. An editing conference in the summer of 1967 will ready the course for national school trials of 1967-68. Allowing the 1968-69 year for revision and preparation for final publication by a commercial publisher, the Settlement Theme course is expected to be available to the public for the 1969-70 school year. Publication dates for the reference volumes now in preparation, on Maps and Air Photos, and on Local Geography, have not been set. Other reference volumes are planned.

I. PROJECT TITLE: Introductory Physical Science (IPS)

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Educational Services Incorporated, 164 Main Street, Watertown, Mass. 02172. 1963

III. PROJECT DIRECTOR: Uri Haber-Schaim

IV. PROJECT HEADQUARTERS ADDRESS: Educational Services Incorporated, 164 Main Street, Watertown, Mass. 02172

V. PROFESSIONAL STAFF: A number of different persons have worked on the project at various times. The preface to the book gives acknowledgments.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Educational Services Incorporated
B. Funding agency: National Science Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: To develop a one-year course in physical science for use in junior high schools. The student laboratory work is of primary importance. To emphasize this the laboratory instructions are incorporated in the body of the text; the results are not described. The equipment has been designed in such a way that the students can perform the experiments in ordinary classrooms.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: The major emphasis in the course is on the study of matter.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Text: Chapters I-XI
2. Teacher's Guide: corresponds to Chapters I-XI
3. Laboratory equipment and apparatus
4. Tests
5. Drill and Quiz Problems

X. USE OF PROJECT MATERIALS: Approximately 350 teachers are using the complete program. Schools where the course is being taught include: Flintridge Preparatory School, Pasadena, Fresno High School, Fresno, Calif.; Evergreen Jr. High School, Evergreen; Belmont Jr. High School, Lakewood; Golden Jr. High School, Golden; Wheat Ridge Jr. High School, Wheat Ridge; Bear Creek Jr.-Sr. High School, Morrison; Creighton Jr. High School, Lakewood; Bell Jr. High School, Golden; Lakewood Jr. High School, Lakewood, Colo.; Salisbury School, Salisbury, Conn.; Springer Jr. High School, Wilmington, Dover High School, Dover, Del.; Fletcher Sr. High School, Jacksonville, Fla.; Glenbard West High School, Glen Ellyn, Maine Township High School East, Park Ridge, Ill.; Roosevelt High School, Des Moines, Iowa; Greenfield Jr. High School, Greenfield; Marblehead Jr. High School, Marblehead; Brookline High School, Brookline; Danvers Jr. High School, Danvers; Xavier High School, Concord; Muzzey Jr. High School, Lexington; Dana Hall School, Wellesley; Marshfield High School, Marshfield; Belmont Jr. High School, Belmont; Wilbraham Academy, Wilbraham; Norwood Jr. High School, Norwood; Dighton-Rehoboth Regional High School, Rehoboth; Bigelow Jr. High School, Newton; Roxbury Latin School, West Roxbury; Haverhill High School, Haverhill, Mass.; Lowell Jr. High School, Flint; Southwestern High School, Flint; Douglas MacArthur High School, Saginaw, Mich.; Frances M. Grass Jr. High School, West St. Paul, Minn.; William Chrisman High School, Independence, Mo.; Princeton Day Schools, The Great Road, Princeton, N. J.; Irondequoit High School; Rogers Middle School; Greece Arcadia High School; Iroquois Middle School; Dake Middle School, Rochester, N. Y.; Talawanda High School, Oxford; Walnut Hills High School, Cincinnati, Ohio; Germantown Friends School, Philadelphia; Marple-Newtown Jr. High School, Newtown Square; Northeast Catholic High School, Philadelphia; Kennett Jr.-Sr. High School, Kennett Square; Paxon Hollow Jr. High School, Newtown Square; Msgr. Bonner High School, Drexel Hill; Abraham Lincoln Jr. High School, Lancaster, Pa.; James R. Lowell Jr. High School, Whittier Jr. High School, San Antonio, Texas; The Putney School, Putney, Vt.; North Central High School, Spokane, Wash.; Rice Lake High School, Rice Lake, Wisc.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None planned at the present time

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:

6. Additional achievement tests
7. Additional drill and quiz problems

XIV. MATERIALS AVAILABLE FREE: Descriptive brochure can be obtained by writing to IPS Program, Educational Services Incorporated, 164 Main Street, Watertown, Mass. 02172

XV. MATERIALS PURCHASABLE: No. 1, $1.40; No. 2, $3.50; No. 4, $9.00, from Prentice-Hall, Inc., Englewood Cliffs, N. J.; No. 3, from Prentice-Hall, Inc., Englewood Cliffs, N. J. and Macalaster Scientific Corp., Watertown, Mass. (see catalogs)

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Feedback from pilot schools is used for evaluation along with achievement tests on the students. For further details, see the Progress Report.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: NSF sponsored in-service and summer institutes. Various locally initiated workshops for teachers.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Work completed on preliminary edition of text and teacher's guide. Additional achievement tests were prepared and preparation of chapter quizzes and drills was done.

XIX. PLANS FOR THE FUTURE: Writing conference planned for the summer of 1966. Publication of the commercial edition of the course planned for March 1967.

I. PROJECT TITLE: K-12 Science Design

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Las Cruces School District No. 2. September, 1961

III. PROJECT DIRECTOR: J. Paul Taylor, Elementary Curriculum Coordinator

IV. PROJECT HEADQUARTERS ADDRESS: 301 West Amador Avenue, Las Cruces, New Mexico

V. PROFESSIONAL STAFF: None described

VI. PROJECT SUPPORT: Las Cruces School District No. 2

VII. SPECIFIC PURPOSES AND OBJECTIVES: To study curricula in science and develop a design which would meet our school district's needs.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Science, Grades 1-12.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Resource Units for First Grade Science - What Can You Do for Good Health? The Earth on Which We Live; What Is Our Earth Like? What Makes Toys Work? Why Are Plants Important to Us? What Is a Farm? The Zoo;
2. Resource Units for Second Grade Science - Animal Unit; Our Five Major Senses; Materials and Energies of the Earth; The Universe;
3. Resource Units for Third Grade Science - The Earth in the Solar System; Weather; Sound; Light;
4. Resource Units for Fourth Grade Science - Mother Earth's Diary, Let's Find Her Secrets; Plants; Animals; Desert Plants and Animals; The Human Machine;
5. Resource Units for Fifth Grade Science - Matter from State to State; Conservation of Soil, Water, and Air; Our Bodies--Chemical Factories; or the Chemistry of Nutrition;
6. Resource Units for Sixth Grade Science - Magnetism and Electricity; How Does Man Use Light and Sound in the World of Communication? The Everyday Atom; Stairway to the Stars; Air Physics;
7. Resource Units for Seventh Grade Biology - All Matter is Made of Elements; Living Things are Dependent upon Their Environment; There Are Many Kinds of Living Things; Living Things Perform Certain Functions in Order to Live;

8. Resource Units for Eighth Grade Chemistry and Earth Science - Matter Matters; The Earth in the Universe;

9. Resource Units for Ninth Grade Physics - Matter, Motion, and Force; Waves and Electrons.

X. USE OF PROJECT MATERIALS: 326 teachers in all elementary and junior high schools in Las Cruces School District No. 2 are using the materials.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: A continuing study of curriculum content in science in grades 10, 11, 12 is being made.

XIV. MATERIALS AVAILABLE FREE: None described

XV. MATERIALS PURCHASABLE: Single copies - $1.00 each; Complete set, grades 1-9 - $5.00.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Teachers will use the materials for two years, making revision notes as the resource units are used. Teachers' comments will be weighed and total program evaluated at the end of two years' use (at the end of the 1966-67 school year). After pertinent revisions are made, the materials will then be used and re-evaluated at regular intervals.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: An in-service meeting introducing materials and a plan for their use was held at the opening of the 1965-66 school year. This was followed by in-service meetings within individual building units. A plan for the use of the materials is described in the foreward of each guide.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Resource units for grades 1, 2, 3, 4, 5, 6, and 9 were made available to teachers at the beginning of the 1965-66 school year. Grades 7 and 8 materials had been made available the previous year.

XIX. PLANS FOR THE FUTURE: It is hoped that during the summer of 1968 teachers who wrote the Science Design can be brought together to update materials. In the meantime, suggestions for improving the guides will be received and considered prior to the writing session.

I. PROJECT TITLE: Laboratory Experiments for Chemistry Courses

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: H. A. Neidig. January, 1965

III. PROJECT DIRECTOR: H. A. Neidig

IV. PROJECT HEADQUARTERS ADDRESS: Lebanon Valley College, Annville, Pa.

V. PROFESSIONAL STAFF: H. A. Neidig, Chairman, Department of Chemistry, Lebanon Valley College; T. G. Teates, Professor, Longwood College, Farmville, Va.; R. T. Yingling, Lebanon Valley College

VI. PROJECT SUPPORT:
A. Organizational sponsorships: None
B. Funding agency: National Science Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: Development and evaluation of laboratory experiments in chemistry that emphasize concepts and ideas rather than descriptive chemistry.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Chemistry; second year chemistry courses in secondary school and first year college chemistry courses.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Twenty-four experiments
2. Four investigations

X. USE OF PROJECT MATERIALS: The course is being taught in: Park County High School, Livingston, Mont.; Madison High School, Madison, N. J.; William Tennent High School, Johnsville, Pa.; Manheim Township, Neffsville, Pa., and Palmyra Area High School, Palmyra, Pa.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: None

XIV. MATERIALS AVAILABLE FREE: None

XV. MATERIALS PURCHASABLE: None

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Experiments and investigations are being used by teachers on both secondary and undergraduate level. The reports and correspondence with teachers and professors provides specific information concerning the usefulness of the materials developed.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: None

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: During the summer of 1966, the staff will prepare manuscripts to be submitted for consideration for publication in such journals as: The Journal of Chemical Education, Chemistry, Current Topics, and The Science Teacher.

I. PROJECT TITLE: The Madison Project of Syracuse University and Webster College

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: Robert B. Davis; Donald E. Kibbey; Beryl S. Cochran; and the faculties of Syracuse University and Webster College. 1957

III. PROJECT DIRECTOR: Robert B. Davis

IV. PROJECT HEADQUARTERS ADDRESS: Webster College, 8356 Big Bend Blvd., Webster Groves, Missouri 63119

V. PROFESSIONAL STAFF: Senior research associates and senior demonstration teachers: Beryl S. Cochran; Frank Van Atta; Donald Cohen; Katharine Kharas; Katharine Vaughn; Katie Reynolds; Ogie Wilkerson; Gordon Clem; Louis Cohen; Judith Miller; Doris Machtinger; Irene Travis; Administrative Assistants: Martha Bowen, Martha Rollins; In charge of Films and Videotapes: Louise Daffron; In charge of Manuscript Production: Bernice Talamante; Coordinators for Syracuse University: Donald E. Kibbey, Chairman Mathematics Department, and Dean David Krathwohl, College of Education; Coordinator for Webster College: Sister M. Jacqueline Grennan S. L., President, Webster College

VI. PROJECT SUPPORT:
A. Organizational sponsorships: Syracuse University, Webster College, and a group of participating school systems
B. Funding agencies: National Science Foundation and the United States Office of Education, with some participation of Ford Foundation funds. Originally supported also by the Marcel Holzer Foundation, The Alfred P. Sloan Foundation, and a group of industries and trade unions in the St. Louis area, as well as by contributions from participating schools and colleges.

VII. SPECIFIC PURPOSES AND OBJECTIVES: To develop, disseminate and implement a supplementary program in mathematics for nursery school through grade 12. Special attention is given to the kind of creative learning experience which children can have in school and outside of school. This involves extensive consideration of the social organization of the classroom and of similar matters. In general, the "point of intervention" for the Madison Project is either at the point of actual classroom experience of the child, or else at the point of instructional planning on the part of the teacher. It is not at the point of designing textbooks or producing textbooks.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: The mathematical content consists mainly of coordinate geometry, an axiomatic approach to algebra, some mathematical logic, and applications to physical science. Grade levels range from nursery school through college.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Discovery in Mathematics. (Publishers, Addison-Wesley Publishing Co., Inc.) Student discussion guide, plus text for teachers. This book provides a supplementary program in coordinate geometry, axiomatic algebra, and applications to science, suitable especially for grades 4 - 8. It is concerned particularly with creative learning experiences of a non-routine nature.
2. Matrices, Logic and other Topics. (In preparation) To be published by Addison-Wesley Publishing Co., Inc. Student discussion guide, plus text for teachers.
2a. Explorations in Mathematics (revised edition of #2 above, available from Addison-Wesley).
3. Axioms for Arithmetic and Algebra. This volume was intended to introduce elementary school teachers to the general outlines of an axiomatic approach to arithmetic and algebra.
4. A Modern Mathematics Program as it Pertains to the Interrelationship of Mathematical Content, Teaching Methods, and Classroom Atmosphere. (The Madison Project). 1963. Report submitted to the Commissioner of Education, U. S. Office of Education, fall, 1963. This provides a general view of Madison Project activities.
5. A Modern Mathematics Program as it Pertains to the Interrelationship of Mathematical Content, Teaching Methods, and Classroom Atmosphere. (The Madison Project). 1965. Report submitted to the Commissioner of Education, U. S. Office of Education, fall, 1965. Note that this is distinguishable from item #4 above only by the date. The 1965 re-

port is the most comprehensive description presently available of Madison Project materials and activities.

6. The Madison Project - A Brief Introduction to Materials and Activities. (1962) This pamphlet is intended to answer some questions about the Project.

6a. The Madison Project - A Brief Introduction to Materials and Activities. (1965)

7. Math Takes a New Path. This pamphlet is a reprint of an article from The PTA Magazine (February, 1963).

8. Notes on the Film: A Lesson with Second Graders
9. Notes on the Film: Matrices
10. Notes on the Film: First Lesson

These pamphlets accompany the films of the same name.

11. Mathematical Thought and the Nature of Learning - The Madison Project View. Reprint of a speech presented at the Educational Records Bureau Meeting, New York City, November 1962.

12. The Evolution of School Mathematics. Reprinted from Journal of Research in Science Teaching.

13. The Madison Project's Approach to a Theory of Instruction.

14. What Do We Mean by "Discovery"?

15. Goals for School Mathematics: The Madison Project View. This pamphlet is a reprint of an article appearing in the Journal of Research in Science Teaching, Vol. 2, pp 309-315 (1964)

16. Experimental Course Report/Grade Nine

17. Experimental Course Report/Kindergarten

18. Supplementary Modern Mathematics for Grades 1 through 9. In-Service Course #1 for Teachers. This is a complete "packaged" in-service course, including films, written materials, and laboratory equipment

19. Supplementary Modern Mathematics for Grades 2 through 9. In-Service Course #2 for Teachers. This is a sequel to #15 above.

20. Audio tape recording #D-1: $\square + \square = 2 \text{ x } \square$. This is a recording of an actual classroom lesson with fifth grade children, proving algebraic theorems from a set of axioms selected by themselves.

21. Film (16mm., sound, black and white) A Lesson with Second Graders. This film shows an actual classroom lesson involving signed numbers, the number line, and Cartesian co-ordinates. Viewing this film is one of the best introductions to Project activities.

22. Film (16mm., sound, black and white) Complex Numbers

via Matrices. This film shows an actual classroom lesson. Seventh-grade students use the isomorphism between rational numbers and a subset of the set of 2-by-2 matrices to facilitate an extension into complex numbers.

23. Film (16mm., sound, black and white) Matrices. An actual classroom lesson. Fifth and sixth graders explore the algebra of 2-by-2 matrices.

24. Film (16mm., sound, black and white) Solving Equations with Matrices. An actual classroom lesson, similar to #19 above, but less sophisticated. Sixth-grade students.

25. Film (16mm., sound, black and white) Average and Variance. An actual classroom lesson, with 6th grade children.

26. Film (16mm., sound, black and white) Graphing an Ellipse. An actual classroom lesson, with 7th grade students.

27. Film (16mm., sound, black and white) Circles and Parabolas. An actual classroom lesson, with 6th grade children.

28. Film (16mm., sound, black and white) First Lesson. An actual classroom lesson, with a mixed class of children from grades 3 through 7.

29. Film (16mm., sound, black and white) Second Lesson. This lesson occurred on the day following that shown in #25, above, with the same student.

30. Film (16mm., sound, black and white) Weights and Springs. A "laboratory" lesson, with 6th grade children.

31. Film (16mm., sound, black and white) Graphing a Parabola. This is a portion of the film listed above as #24.

32. Film (16mm., sound, black and white) Guessing Functions. A seventh grade class of culturally deprived urban children.

33. "Shoebox" packages for physical experiments related to the mathematics program, or for physical and tactile experiences related to the learning of mathematics.

X. USE OF PROJECT MATERIALS: Specific schools where materials are being used: Weston, Connecticut Elementary School; St. Thomas Choir School, New York City; Attucks Branch, St. Louis Public Schools; Columbia School, St. Louis Public Schools; Bruce

Elementary School, Model School District, Washington, D. C.; Montgomery Elementary School, Model School District, Washington, D. C.; Bancroft School, Model School District, Washington, D. C.; Admiral Richard E. Byrd School, Chicago Public Schools (Saturday programs for teachers).

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: No definite plans for translation at present. Some exploratory moves in the direction of French and Spanish translations. Anyone interested in translations should contact the Project at its Webster Groves office.

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Generally similar to those listed under IX.

XIV. MATERIALS AVAILABLE FREE: None described

XV. MATERIALS PURCHASABLE:
1. Discovery in Mathematics, A Text for Teachers, and the companion volume Discovery in Mathematics, Student Discussion Guide, are available from Addison-Wesley Publishing Co., Reading, Mass.
2a. Explorations in Mathematics, A Text for Teachers, and the companion volume Explorations in Mathematics, Student Discussion Guide, are also available from Addison-Wesley at the address given above. Other materials are available from The Madison Project, 8356 Big Bend Blvd., Webster Groves, Missouri

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Described in Project reports

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Workshops are being arranged or are in operation in various cities, including Chicago, St. Louis, San Diego, New York City, Los Angeles and Washington, D. C.; summer institutes at Syracuse University, Webster College and elsewhere.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: See Quarterly Reports and Report to the Commissioner of Education dated 1965, item 5 under IX.

XIX. PLANS FOR THE FUTURE: Materials for individualized study at the level of grades 6 - 12.

I. PROJECT TITLE: Mayaguez Curriculum Center - Production and Translation of Science Materials

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Department of Education. 1963

III. PROJECT DIRECTOR: None listed

IV. PROJECT HEADQUARTERS ADDRESS: Curriculum Center, Las Lomas, Rio Piedras, Puerto Rico, c/o Department of Education, Hato Rey, Puerto Rico

V. PROFESSIONAL STAFF: Sylvia Viera, Coordinator Curriculum Center; Milagros G. de Negroni, Director; Fernando Cofresi, Consultant.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: None listed
B. Funding agencies: Ford Foundation, and Department of Education of Puerto Rico

VII. SPECIFIC PURPOSES AND OBJECTIVES: In-service training for Elementary School teachers (5th and 8th grade) in the new science programs; and to develop different activities to improve the content of the eighth grade textbook units.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Science--A Process Approach, K-3; Biology - 9th, 10th, 11th or 12th grade; General Science - 8th grade; Electricity.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
A. Units
    1. Electricity
    2. Several units for each one of the chapters of the BSCS textbook.
B. A list of activities to improve the content of the eighth grade textbook units.

X. USE OF PROJECT MATERIALS: 30 teachers have participated in in-service training in the "Science--A Process Approach" program. Several teachers have tried out the Biology units prepared at the Center.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Spanish

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Possibly in English

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Translations of several CHEM Study units and BSCS blocks.

XIV. MATERIALS AVAILABLE FREE: None described

XV. MATERIALS PURCHASABLE: None described

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Extensive classroom testing by resident teachers, consultants, and curriculum technicians.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: To train three groups of secondary school teachers in the CHEM, BSCS, and PSSC programs; in-service training for school directors, general supervisors, and superintendents in "Science--A Process Approach" program; and in-service training for kindergarten and fifth grade school teachers in the "Science--A Process Approach" program.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: The Center plans to continue with the in-service training already mentioned.

I. PROJECT TITLE: Michigan Science Curriculum Committee Junior High School Project (MSCC-JHSP)

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Michigan Science Curriculum Committee, Michigan State Department of Education. October, 1963

III. PROJECT DIRECTOR: W. C. Van Deventer

IV. PROJECT HEADQUARTERS ADDRESS: Department of Biology, Western Michigan University, Kalamazoo, Mich. 49001

V. PROFESSIONAL STAFF: Robert R. Sternberg, Associate Director, Michigan State Department of Education; Lucile Duyser, Editor of project materials, Teacher, Grand Rapids Public Schools, Grand Rapids, Mich.; John Rosemergy, Consultant, Science Curriculum Director, Ann Arbor Michigan Public Schools; David Schulert, Consultant, Science Curriculum Director, Lansing Michigan Public Schools; Peter Wallus, Consultant, Curriculum Director, Kalamazoo Michigan Public Schools

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Michigan Science Curriculum Committee, Michigan State Department of Education
B. Funding agency: U. S. Office of Education

VII. SPECIFIC PURPOSES AND OBJECTIVES:
1. To develop junior high school laboratory experiences which are directed toward selected interdisciplinary ideas
2. To develop a means of testing the extent of students' understanding of these ideas as a result of open-ended laboratory experiences

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Seventh grade general science

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Rationale of the project, Directing Inquiry Toward Cross-Cutting Ideas in Science Through the Use of Simple, Open-Ended Laboratory Experiences
2. Laboratory Experiences based on the following ideas:
   a. Change and Variation
   b. Normal Curves and Warping Factors

    - c. Gradients
    - d. Extrapolation and Interpolation
    - e. Directional Change in Response to the Challenge of the Environment
    - f. Cycles and Cyclic Change
    - g. Measurement as an Expression of Relationship
    - h. Interdependence
    - i. Necessary Interaction of Heredity and Environment
    - j. Dynamic Equilibrium
    - k. Differential Rates of Processes
    - l. Tools, Devices, and Outside Sources of Energy as Extensions of Man's Body

3. Suggested Procedure for a Teacher Wishing to Use MSCC-JHSP Materials, and sample tests

X. USE OF PROJECT MATERIALS: 16 teachers are using the complete program and 75 others are using portions of it. Some specific schools where materials are used: Ann Arbor City Schools, Ann Arbor, Mich.; Lansing City Schools, Lansing, Mich.; Grand Rapids City Schools, Grand Rapids, Mich.; Kalamazoo City Schools, Kalamazoo, Mich.,

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Additional laboratory experiences under the Ideas listed in response to Question IX will be produced in the coming academic year.

XIV. MATERIALS AVAILABLE FREE: All of the materials listed under IX above

XV. MATERIALS PURCHASABLE: None

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Materials are currently being evaluated informally in all of the schools where they are being used. A formal testing program is being developed and is projected through the next four years. Experimental testing is based on evaluating the questions asked by students in terms of the ideas toward which the laboratory experiences are directed. It is believed that the questions which students ask furnish a better indication of their thinking than any answers that they would give to questions that were asked them. The investigators believe that the development of a testing program is vital to the success of the project. Major efforts so far have been devoted to writing laboratory experiences and statements of ideas. Major emphasis from this point on will be on testing and evaluation.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: The Director and Associate Director of the project have worked directly with groups of teachers in the project centers. This is possible since all such centers are located in Michigan. No further formal training program is anticipated at the present time.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported

XIX. PLANS FOR THE FUTURE:
1. 1966-67, completion of writing of experimental project materials
2. 1966-67, 1967-68, 1968-69, 1969-70, continued work with present testing centers in Michigan, with emphasis on problems of evaluation
3. 1970-71, editing and rewriting of project materials for publication

I. PROJECT TITLE: Minnesota Mathematics and Science Teaching Project (MINNEMAST)

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Paul C. Rosenbloom, formerly Professor of Mathematics and Director of Minnesota School Mathematics and Science Center, University of Minnesota. Present address: Columbia University. 1961

III. PROJECT DIRECTOR: James H. Werntz, Jr.

IV. PROJECT HEADQUARTERS ADDRESS: 720 Washington Ave., S. E., Minneapolis, Minn. 55414

V. PROFESSIONAL STAFF: Mason R. Boudrye, Administrator; Wells Hively, Research Director; Nathan W. Gottfried, Evaluation and Field Studies; and 40 additional scientists, mathematicians, writers, illustrators, and editors

VI. PROJECT SUPPORT:
A. Organizational sponsorship: University of Minnesota
B. Funding agency: National Science Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: To produce coordinated mathematics and science curriculum for grades K-6, and organized materials for in-service education of teachers.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Coordinated mathematics and science, elementary and college level.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Mathematics, K-4
2. Science, K-2
3. College mathematics, outline and sample chapters
4. College science, outline and sample chapters
5. Mathematics tests K-1 (Gottfried)
6. MINNEMAST reports, quarterly

X. USE OF PROJECT MATERIALS: 200 teachers are using some of the materials in cooperating elementary schools associated with 10 colleges serving as trial centers.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE

PRINTED IN TRANSLATION: None

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:
7. Mathematics, grade 5
8. Science, grades 2, 3
9. MINNEMAST reports

XIV. MATERIALS AVAILABLE FREE: 6. MINNEMAST reports, quarterly.

XV. MATERIALS PURCHASABLE: Sample copies only; write Project administrator for price list.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Classroom materials (mathematics K-4) and (science K-2) are used on an experimental basis in approximately 200 classrooms under the supervision of 10 cooperating colleges. Written comments about the clarity of the background material, ease of using the lessons, and observations of the children's reactions are obtained from the teachers. Achievement tests based on revision of items constructed last year have been developed for kindergarten and 1st grade. Evaluation of in-service mathematics and science materials is being conducted. Changes in subject matter performance and attitudes toward mathematics and science are being examined.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: In-service materials being revised and tested.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Continuing production of curriculum materials in science and mathematics.

XIX. PLANS FOR THE FUTURE: Curriculum materials for grades 5-6 mathematics, 3-6 science. Summer 1966, writing conference; Spring 1966, planning conference.

I. PROJECT TITLE: Oakleaf Individualized Elementary School Science

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: J. Lipson; J. Bolvin; M. Campbell; R. Chemas. June, 1964

III. PROJECT DIRECTOR: R. Glaser

IV. PROJECT HEADQUARTERS ADDRESS: Learning Research & Development Center, University of Pittsburgh, Pittsburgh, Pa. 15213

V. PROFESSIONAL STAFF: J. Lipson; Press Steele; Nancy Manning; Lois Hayweiser; Mary Brown

VI. PROJECT SUPPORT:
A. Organizational sponsorships: Learning Research & Development Center and Baldwin-Whitehall School District
B. Funding agency: U. S. Office of Education

VII. SPECIFIC PURPOSES AND OBJECTIVES:
1. Develop a curriculum and instructional materials for laboratory experiences which allow each child to proceed at his own rate through the objectives of the curriculum.
2. Develop a system for evaluating objectives and materials on the basis of student performance.
3. Evaluate the value of individualized instruction as an educational system.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL:

1. Magnetism	K-6
2. Light	2-6
3. Discrimination, Sorting, & Classification	K-2
4. Measurement	1-3

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:

1. Magnetism	60 lessons & materials
2. Light	30 lessons
3. Discrimination, Sorting & Classification	35 lessons

X. USE OF PROJECT MATERIALS: One teacher is using the materials at Oakleaf School, Oakleaf Drive, Pittsburgh 36, Pa.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:
4. Measurement 75 lessons

XIV. MATERIALS AVAILABLE FREE: Scripts of lessons are free, but supply is limited. Obtained by writing to Joseph Lipson

XV. MATERIALS PURCHASABLE: None

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Performance tests on specific objectives and transfer tests on related problems will be given. The individual taped questions require manipulation of provided material objects, and student recording of results. Each objective is tested with new materials to prevent memorized responses.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: None

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported

XIX. PLANS FOR THE FUTURE: At current rate we need about 5-10 years to complete a set of laboratory lessons for K-6.

I. **PROJECT TITLE: Physical Science Study Committee Advanced Topics (PSSC)**

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Educational Services Incorporated, Physical Science Study Committee, 164 Main Street, Watertown, Mass. 02172. 1962

III. PROJECT DIRECTOR: Uri Haber-Schaim

IV. PROJECT HEADQUARTERS ADDRESS: Educational Services Incorporated, 164 Main Street, Watertown, Mass. 02172

V. PROFESSIONAL STAFF: This cannot be answered here because of the number of people who have worked on the project at various times.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: National Science Foundation
B. Funding agencies: National Science Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: Development of advanced topics in physics for use in high school and college physics courses. They can be used in a separate course or interspersed in the basic PSSC course.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Angular momentum, relativity, statistical mechanics, quantum physics. Secondary school and college

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Revised, one-volume edition of test and laboratory guide

X. USE OF YOUR PROJECT MATERIALS: We do not have specifics on schools teaching Advanced Topics.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGE(S) INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None at present

XIII. MATERIALS PRESENTLY BEING DEVELOPED:
2. Revised Teacher's Guide

XIV. MATERIALS AVAILABLE FREE: None

XV. MATERIALS PURCHASABLE:
1. From D. C. Heath and Company; cost not determined at time of this report

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Most parts of the course were tried out in pilot schools. No further evaluation plans.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: See NSF-sponsored institutes

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Preparation of rewriting and editing of previously printed material. New chapter on entropy prepared.

XIX. PLANS FOR THE FUTURE: Revised Teacher's Guide planned for the fall of 1966. Preparation of achievement tests planned.

I. PROJECT TITLE: Physical Science Study Committee Physics Course (PSSC)

II. PRINCIPAL ORIGINATOR: Educational Services Incorporated, under the leadership of Jerrold R. Zacharias and Francis L. Friedman

III. PROJECT DIRECTOR: Jerrold R. Zacharias

IV. PROJECT HEADQUARTERS ADDRESS: PSSC-ESI, 164 Main Street, Watertown, Mass. 02172

V. PROFESSIONAL STAFF: Uri Haber-Schaim; James Walter; Judson B. Cross; Ervin H. Hoffart; John DeRoy; and Andrea Julian, Staff; Byron Youtz, Editor, Second Edition PSSC; Gavriel Elek, Visiting Staff

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Educational Services Incorporated
B. Funding agency: National Science Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: To present physics as a unified but continuing process by which men seek to understand the nature of the physical world. Employs laboratory experimentation to encourage the student's spirit of inquiry.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: High School physics dealing with matter, time, space, light, motion and the nature of electrical forces and energy.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Physics, 1960; revised ed. 1965 (the PSSC physics course textbook published by D. C. Heath and Co., Boston, Mass.)
2. Laboratory Guide for Physics, 1960; revised ed. 1965 (to accompany the textbook, D. C. Heath and Co., Boston, Mass.)
3. PSSC Physics Teacher's Resource Book and Guide, 1960; revised ed. 1965-66; and Supplement to the Teacher's Resource Book and Guide. (D. C. Heath and Co., Boston, Mass.)
4. Laboratory apparatus (manufactured by Macalaster Scientific Corporation, Watertown, Mass.; Science Electronics, Inc. (LINCO), Cambridge, Mass.; and Welch Scientific Company, Skokie, Ill.)
5. PSSC Films and The Teacher's Guide to PSSC Films.

(More than fifty films and the guide are distributed by Modern Learning Aids, 3 East 54th Street, New York)

6. Science Study Series. (Over 40 paperback books that provide authoritative science literature for students and adults. Published by Doubleday-Anchor Books)

7. Tests of the Physical Science Study Committee, Series O, N, and S. (Available from Cooperative Test Division, Educational Testing Service, Princeton, N. J.)

X. USE OF PROJECT MATERIALS: Over 5,000 teachers are using the complete program, and between 2,000-3,000 teachers are using portions of the materials. The ESI Quarterly Report lists specific schools where materials are being used.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Japanese, Spanish, Hebrew, French, Danish, Norwegian, and others.

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: None described

XIV. MATERIALS AVAILABLE FREE: Quarterly Reports of Educational Services Incorporated, 164 Main Street, Watertown, Mass. 02172

XV. MATERIALS PURCHASABLE: Items Nos. 1, 2, 3, 4, 5, 6 and 7.

XVI. SPECIFIC PLANS FOR EVALUATION: Preliminary editions were tried, evaluated and revised for three years before being published commercially in 1960. Teachers submitted feedback forms.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: NSF supported summer, in-service, and academic year teacher training institutes.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: A second edition of all course materials has been published.

XIX. PLANS FOR THE FUTURE: None described

I. PROJECT TITLE: Ponce Curriculum Center - Production and Translation of Science Materials

II. PRINCIPAL CRIGINATOR AND DATE OF PROJECT INITIATION: Department of Education of Puerto Rico. 1963

III. PROJECT DIRECTOR: None listed

IV. PROJECT HEADQUARTERS ADDRESS: Curriculum Centers, Las Lomas, Rio Piedras, Puerto Rico, c/o Department of Education, Hato Rey, Puerto Rico

V. PROFESSIONAL STAFF: Sylvia Viera, Coordinator, Curriculum Centers; Josefina C. de Oliver, Director; Father Joseph Fronhoefer, Consultant; Sister Joseph Agnes, Consultant.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: None listed
B. Funding agencies: Ford Foundation and Department of Education of Puerto Rico

VII. SPECIFIC PURPOSES AND OBJECTIVES:
A. Tests: to evaluate the material covered in Chapters 1-15 of the BSCS Course (Green Version), and to show teachers the type of evaluation recommended for modern science courses.
B. Units to enrich the Elementary School program.
C. Translation of the new science projects that have been written in the United States.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL:
Tests: General Sciences - 7th, 8th, 9th grade.
Biology (BSCS) - 9th, 10th, 11th or 12th grade.
Translations: Several chapters of the Chemistry (CHEM Study) textbook - 11th and 12th grade; several chapters of the BSCS textbook - 9th, 10th or 12th grade, and adaptation of some units of the ESI materials for elementary school.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Tests: Biology and General Sciences - the type of test used is multiple choice.
2. Units: Biology - The Behavior of the Weevils; Seed Dispersal.

X. USE OF PROJECT MATERIALS: 60 teachers are involved in the testing of biology units and ESI materials. 128 teachers are participating in in-service training for Modern Biology, Chemistry, Physics, and Science for the elementary school. Specific schools where materials are used: Jaime L. Drew; Juan Cuevas Aboy, and Ponce High School, Ponce, Puerto Rico.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Spanish

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Possibly in English

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Tests for Chapter 15 - 20 of the BSCS course.

XIV. MATERIALS AVAILABLE FREE: Tests, units, and translated materials are available through the Curriculum Division of the Department of Education of Puerto Rico.

XV. MATERIALS PURCHASABLE: None

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Tests are administered to groups of different abilities at the same grade level followed by an evaluation session with classroom teachers and consultants.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: An institute will be held this summer to train elementary school teachers in "Science - A Process Approach", (AAAS Project).

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: To write units, such as the ESI units, adapted to the Puerto Rican environment, and to continue the in-service training in the program of the "Science - A Process Approach" mentioned above.

I. PROJECT TITLE: The Portland Project

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: David Porter and William McCord, Washington High School, Portland; Michael Fiasca, Portland State College. 1963

III. PROJECT DIRECTOR: Vernon Cheldelin, Dean, School of Science, Oregon State University

IV. PROJECT HEADQUARTERS ADDRESS: Dr. Michael Fiasca, Portland State College, P. O. Box 751, Portland, Ore. 97207

V. PROFESSIONAL STAFF: None listed

VI. PROJECT SUPPORT:
A. Organizational sponsorships: Portland School District; Portland State College, and Oregon State University
B. Funding agencies: The National Science Foundation; The Portland School District

VII. SPECIFIC PURPOSES AND OBJECTIVES: To develop and test a two-year integrated secondary school physics-chemistry course utilizing content and materials developed by CBA, CHEMS and PSSC.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Senior high school

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Teacher's Guide - CHEMS-PSSC Integration
2. Teacher's Guide - CBA-PSSC Integration
3. Student Guide - CHEMS-PSSC Integration
4. Student Guide - CBA-PSSC Integration

X. USE OF PROJECT MATERIALS: Forty-five teachers are using the complete program. Specific schools where materials are used: Jefferson High School; Washington High School, and Benson High School, Portland, Ore.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: None listed.

XIV. MATERIALS AVAILABLE FREE:
A. Brief Summary of Evaluation Study
B. Enrollment Figures - Schools using the courses with locations. (These are available from Dr. Fiasca at Portland State College)

XV. MATERIALS PURCHASABLE:
1. Teacher's Guide - CHEMS-PSSC
2. Teacher's Guide - CBA-PSSC - $2.50 per set
3. Student Guide - CHEMS-PSSC
4. Student Guide - CBA-PSSC

These are obtainable from: The Portland Curriculum Center, Portland School District, 631 N. E. Clackamas St., Portland, Ore.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Six classes studying the integrated courses from the Portland Metropolitan Area have been compared in achievement, critical thinking and attitudes changes towards science with six physics control classes and six chemistry control classes. A brief summary of achievement results can be obtained from Dr. Fiasca at Portland State College. A detailed description of the study may be found in the unpublished dissertation Feasibility of Integration of Selected Aspects of CBA Chemistry CHEMS Chemistry and PSSC Physics Into a Two Year Physical Science Sequence, Oregon State University.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: None presently planned.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: None

XIX. PLANS FOR THE FUTURE: There is interest among members of the Steering Committee to investigate the possibility of joining modern biology concepts with chemistry and physics into a three year integrated course.

I. PROJECT TITLE: Rio Piedras Curriculum Center - Production of Science Materials

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Department of Education. 1963

III. PROJECT DIRECTOR: None listed

IV. PROJECT HEADQUARTERS ADDRESS: Curriculum Center, Las Lomas, Rio Piedras, Puerto Rico, c/o Department of Education, Hato Rey, Puerto Rico

V. PROFESSIONAL STAFF: Sylvia Viera, Coordinator Curriculum Centers; Ernesto Bobonis, Ken Manfred, Adina Bobonis, Barbara Matthews, Consultants; Ana Maria Luquis, Curriculum Technician.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: None listed
B. Funding agencies: Ford Foundation and Department of Education of Puerto Rico

VII. SPECIFIC PURPOSES AND OBJECTIVES: Production of experimental materials to implement the development of new approaches to the teaching of science content at the elementary level; in-service training for the Modern Biology, Chemistry, and Physics courses and for Gen. Science teachers at the secondary level; and extensive classroom testing of science materials produced in the Curriculum Center.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: 1st, 2nd, 5th and 6th grades. Biology, Physics, Chemistry, and Geology.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
Dialogues classes (Parlantes):
1. Classification. Animals or pictures of animals are used so that the student will classify them using their own criteria. Later, they will read a selection about Linneaus classification, and will compare it with their own classification.
2. Physics - Earth Rotation. The class begins with a discussion of the fact that day and night can be explained in two different ways: the Sun moves around the earth while the latter stays still or the Earth rotates while the Sun stays still. This situation brings about a problem: Which of these hypotheses best explains the phenomena of day and night.

The teacher performs a demonstration with a pendulum from which the students learn about the properties of a pendulum. This knowledge will help them to understand a reading selection on Foucault's experiments. These experiments give evidence that day and night occur as a result of Earth's rotation.
3. Chemistry - Matter and its properties
   a. Physical properties of matter - Three substances are used which are similar in appearance so that the students question themselves if those substances are the same or different. To solve the problem they will suggest some experiments. Analyzing the data obtained from these experiments they will discover that two of the substances behave in the same way and one behaves differently. This will enable them to realize that matter has different properties which define it.
   b. Chemical Change of Matter - Two familiar substances are presented to the student. These substances are dissolved in distilled water and then mixed together. This situation raises a problem, which is solved later by comparing the properties of the substance that is formed with the properties of the original substances.

X. USE OF PROJECT MATERIALS: 322 teachers have participated in in-service training for the following courses: Modern Biology, Physics, Chemistry, and Science for the Elementary School. 120 teachers have tried out materials prepared at the Curriculum Center on the upper grades of the Elementary School.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: Spanish

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Possibly in English

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: New dialogue classes are being developed:
1. Geology - Classification Concepts
2. Biology - Similarities and Differences of the Organisms; Heredity in Plants and Animals
3. Physics - Air Occupies Space; Properties of Air; Inertia.

XIV. MATERIALS AVAILABLE FREE: Dialogue classes are available through the Curriculum Division at the Department of Education of Puerto Rico.

XV. MATERIALS PURCHASABLE: None

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Extensive classroom testing by author, resident teachers, curriculum technician, and consultants is being done by going into the classrooms and giving the class to groups of different abilities at the same grade level followed by an evaluation session. The children are also asked to contribute written comments.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Bi-monthly, day-long seminars are held in which lectures are given, readings discussed, films evaluated, laboratories prepared and tested, and original researches discussed from the view point of a more effective classroom use of available materials.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported

XIX. PLANS FOR THE FUTURE: The Center plans to continue with the in-service training already mentioned and with the development of dialogue classes for the Elementary School.

I. PROJECT TITLE: School Mathematics Study Group (SMSG)

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: Presidents of the American Mathematical Society, Mathematical Association of America, and the National Council of Teachers of Mathematics. 1958

III. PROJECT DIRECTOR: E. G. Begle

IV. PROJECT HEADQUARTERS ADDRESS: SMSG - Cedar Hall, Stanford University, Stanford, California 94305

V. PROFESSIONAL STAFF: Leonard Cahen, Project Coordinator, National Longitudinal Study of Mathematical Abilities; James Wilson, Project Coordinator, Research and Analysis; and Anneli Lax, Executive Editor, Monograph Project

VI. PROJECT SUPPORT:
A. Organizational sponsorships: Stanford University and the Conference Board of the Mathematical Sciences
B. Funding agency: National Science Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: The primary purpose of the SMSG is to foster research and development in the teaching of school mathematics. The work of SMSG consists primarily in the development of courses, teaching materials and teaching methods. It is a part of SMSG's task, in cooperation with other mathematical organizations, to encourage exploration of the hypotheses underlying mathematics education.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Mathematics, kindergarten through grade 12; teacher training materials

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
Newsletters. Information concerning SMSG is disseminated through its Newsletters which appear at irregular intervals. Names are added to the mailing list for these Newsletters on request.
1. Organization, history and activities of SMSG
2. Minnesota National Laboratory reports
3. Teachers' reports on experimental units for grades 7 and 8

4. Progress report on the work of SMSG
5. In-service preparation of mathematics teachers
6. Progress report on the work of SMSG and order form
7. Publications available from Yale University Press
8. Announcement of the New Mathematical Library Series
9. Materials which should be ordered from SMSG
10. Reports on student achievement in SMSG courses
11. Future of SMSG, new projects and publications
12. In-service education program and announcement of textbooks
13. How texts are prepared and publications list
14. New Mathematical Library series in print and preparation
15. Reports on various SMSG projects
16. SMSG publications
17. Lists Supplementary Publications and selected list of inexpensive books for supplementary use
18. New SMSG publications
19. Report of a survey of in-service programs for mathematics teachers
20. SMSG publications
21. Reference guide to the New Mathematical Library Description, Topical classification and Index with suggested grade levels
22. SMSG publications

Sample Textbooks. Textbooks for grades K through 12 have been prepared to illustrate the kind of mathematics curriculum which SMSG believes is both appropriate and feasible for today.

23. Mathematics for the Elementary School
    Book K, Teacher's Commentary
24. Book 1, Student's Text, Parts I, II and III
25. Book 1, Teacher's Commentary, Parts I, II and III
26. Book 2, Student's Text, Parts I, II and III
27. Book 2, Teacher's Commentary, Parts I, II and III
28. Book 3, Student's Text, Parts I, II and III
29. Book 3, Teacher's Commentary, Parts I, II and III
30. Grade 4, Student's Text, Parts I and II
31. Grade 4, Teacher's Commentary, Parts I and II
32. Grade 5, Student's Text, Parts I and II
33. Grade 5, Teacher's Commentary, Parts I and II
34. Grade 6, Student's Text, Parts I and II
35. Grade 6, Teacher's Commentary, Parts I and II
36. Mathematics for Junior High School
    Volume I, Student's Text, Parts I and II

37. Volume I, Teacher's Commentary, Parts I and II
38. Volume II, Student's Text, Parts I and II
39. Volume II, Teacher's Commentary, Parts I and II
40. First Course in Algebra
    Student's Text, Parts I and II
41. Teacher's Commentary, Parts I and II
42. Geometry
    Student's Text, Parts I and II
43. Teacher's Commentary, Parts I and II
44. Geometry with Coordinates
    Student's Text, Parts I and II
45. Teacher's Commentary, Parts I and II
46. Intermediate Mathematics
    Student's Text, Parts I and II
47. Teacher's Commentary, Parts I and II
48. Elementary Functions
    Student's Text
49. Teacher's Commentary
50. Introduction to Matrix Algebra
    Student's Text
51. Teacher's Commentary
52. Introduction to Secondary School Mathematics
    Volume I, Student's Text, Parts I and II
53. Volume I, Teacher's Commentary
54. Volume II, Student's Text, Parts I and II
55. Volume II, Teacher's Commentary
56. Introduction to Algebra
    Student's Text, Parts I and II
57. Teacher's Commentary, Parts I and II
58. Analytic Geometry
    Student's Textbook
59. Teacher's Commentary

Programmed Material. A programmed version of No. 40 was prepared for experimental purposes and now has been made available for general use.

60. Programmed First Course in Algebra (Form H)
    Textbook, 2 Parts, and Teacher's Commentary (one part)
61. Response Booklet
62. Calculus
    Textbook, Parts I and II
63. Teacher's Commentary, Parts I and II
64. Textbook, Part III
65. Teacher's Commentary, Part III
66. SMSG: The Making of a Curriculum

Supplementary Units. A variety of units requiring less than an academic year have been prepared.

67. Mathematics Through Science
    Part I, Student's Text
68. Part I, Teacher's Commentary
69. Part II, Student's Text
70. Part II, Teacher's Commentary
71. Part III, Student's Text
72. Part III, Teacher's Commentary
73. Mathematics and Living Things
    Student's Textbook
74. Teacher's Commentary
75. Junior High School Mathematics Units
    Number Systems, Student's Text
76. Number Systems, Teacher's Commentary
77. Geometry, Student's Text
78. Geometry, Teacher's Commentary
79. Applications, Student's Text
80. Applications, Teacher's Commentary
81. Junior High School Supplementary Unit, Text
82. Junior High School Supplementary Unit, Commentary
83. Essays on Number Theory, I
84. Essays on Number Theory, II
85. Development of the Real Number System
86. Selected Units, Grade 4 (E-4150)

Supplementary and Enrichment Series. Small classroom units designed to allow teachers to try modern mathematics in their classrooms without having to undertake a full year's course, and also for use as outside reading by more capable students.

87. Functions, Student's Text
88. Circular Functions, Student's Text
89. Functions, Circular Functions, Teacher's Commentary
90. The Complex Number system, Student's Text
91. The Complex Number System, Teacher's Commentary
92. The System of Vectors, Student's Text
93. The System of Vectors, Teacher's Commentary
94. Non-Metric Geometry, Student's Text
95. Non-Metric Geometry, Teacher's Commentary
96. Plane Coordinate Geometry, Student's Text
97. Plane Coordinate Geometry, Teacher's Commentary
98. Inequalities, Student's Text
99. Inequalities, Teacher's Commentary
100. Numeration, Student's Text
101. Numeration, Teacher's Commentary

102. Algebraic Structures, Text and Answers
103. Factors and Primes, Student's Text
104. Factors and Primes, Teacher's Commentary
105. Mathematical Systems, Student's Text
106. Mathematical Systems, Teacher's Commentary
107. Systems of First Degree Equations in Three Variables, Student's Text
108. Systems of First Degree Equations in Three Variables, Teacher's Commentary
109. Radioactive Decay

Studies in Mathematics. Volumes intended explicitly for teachers.

110. Euclidean Geometry Based on Ruler and Protractor Axioms
111. Structure of Elementary Algebra
112. Geometry
113. Concepts of Informal Geometry
114. Number Systems
115. Intuitive Geometry
116. Concepts of Algebra
117. Brief Course in Math for Elementary School Teachers
118. Applied Mathematics in the High School
119. Mathematical Methods in Science
120. A Brief Course in Mathematics for Junior High School Teachers
121. In-service Course for Primary School Teachers
122. Introduction to Number Systems

Conference Reports. Reports of conferences organized by SMSG to discuss various aspects of mathematics education.

123. Elementary School Mathematics
124. Orientation Conference for SMSG Experimental Centers
125. Orientation Conference for SMSG Elementary School Experimental Centers
126. Orientation Conference for Geometry with Coordinates
127. Future Responsibilities for School Mathematics
128. Mathematics Education for Below Average Achievers

Study Guides in Mathematics. Annotated bibliographies for teachers wishing to study by themselves.

129. Study Guides in Mathematics (Volume includes Algebra, Calculus, Digital Computing and related mathematics, Geometry, Intermediate Mathematics, Number Theory, Probability and Statistics)
130. Very Short Course in Math for Parents

Spanish Translations. A number of the SMSG texts have been translated into Spanish for use in Puerto Rico.

131. Matematicas Para El Primer Ciclo Secundario, Text - 2 Parts, Volumen I
132. Matematicas Para El Primer Ciclo Secundario, Comentario - 2 Parts, Volumen I
133. Matematicas Para El Primer Ciclo Secundario, Text - 2 Parts, Volumen II
134. Matematicas Para El Primer Ciclo Secundario, Comentario - 2 Parts, Volumen II
135. Matematica Para La Escuela Secundaria, Primer Curso de Algebra, Text - 2 Parts
136. Matematica Para La Escuela Secundaria, Primer Curso de Algebra, Comentario - 2 Parts
137. Matematica Para La Escuela Secundaria, Geometria, Text - 2 Parts
138. Matematica Para La Escuela Secundaria, Geometria, Comentario - 2 Parts
139. Matematicas Para La Escuela Secundaria, Matematica Intermedia, 2 Parts
140. Matematicas Para La Escuela Secundaria, Funciones Elementales
141. Matematicas Para La Escuela Secundaria, Introduccion Al Algebra De La Matrices
142. Matematicas Para La Escuela Primaria, Grado 6, 2 Parts, Comentario
143. El Curso Conciso En Matematicas Para Los Profesores De Escuela Primaria

Films. A series of 30 half-hour films constitute an in-service course for elementary school teachers. No. 117 above is the text for this course. These films are distributed by Modern Learning Aids, 3 East 54th Street, New York, N. Y. 10022

X. USE OF PROJECT MATERIALS: Specific information is not available. Approximately 2 million students used SMSG materials in the 1965-66 academic year.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Spanish, Swedish, Turkish, Chinese

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Additional student texts and teacher's commentaries will be translated into Spanish. A high school course on computation is in preparation.

XIV. MATERIALS AVAILABLE FREE: Newsletters Nos. 10, 14, 15, 17, 19, 21, and 22 are available on request from SMSG headquarters.

XV. MATERIALS PURCHASABLE:

Item	Price	Item	Price	Item	Price	Item	Price
23	$ .50	55	$3.00	87	$ .25	119	$1.00
24	1.00	56	3.00	88	.25	120	3.00
25	2.50	57	3.00	89	.25	121	1.50
26	1.00	58	1.50	90	.25	122	1.50
27	2.50	59	1.00	91	.25	123	.40
28	1.00	60	5.00	92	.25	124	1.00
29	2.50	61	.50	93	.25	125	1.00
30	3.00	62	3.00	94	.25	126	.40
31	3.00	63	3.00	95	.25	127	.25
32	3.00	64	2.00	96	.25	128	.50
33	3.00	65	2.00	97	.25	129	.50
34	3.00	66	4.00	98	.25	130	.25
35	3.00	67	.75	99	.25	131	2.00
36	3.00	68	.50	100	.25	132	2.00
37	3.00	69	.75	101	.25	133	2.00
38	3.00	70	.50	102	.25	134	2.00
39	3.00	71	.75	103	.25	135	2.00
40	3.00	72	.50	104	.25	136	2.00
41	3.00	73	.75	105	.25	137	2.00
42	3.00	74	.50	106	.25	138	2.00
43	3.00	75	.70	107	.25	139	2.00
44	3.00	76	.70	108	.25	140	1.50
45	3.00	77	.60	109	.25	141	1.50
46	3.00	78	.60	110	.90	142	4.00
47	3.00	79	.40	111	1.40	143	2.00
48	2.00	80	.40	112	2.75		
49	2.00	81	.80	113	1.45		
50	2.00	82	.65	114	2.40		
51	2.00	83	.30	115	1.25		
52	3.00	84	.50	116	2.40		
53	3.00	85	.90	117	2.00		
54	3.00	86	.75	118	.75		

Student texts and teacher commentaries are available from Yale University Press, SMSG - 92A Yale Station, New Haven, Connecticut; others, from A. C. Vroman, Inc., 367 South Pasadena Avenue, Pasadena, Calif. See Newsletter No. 22 for details.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Textbooks are evaluated by teachers who try them in class and are revised until it is agreed that the texts are teachable. Evaluation through student achievement follows. Reports on some evaluations will be found in Newsletters 10 and 15. The bulk of this evaluation is in process in the National Longitudinal Study of Mathematical Abilities. The bulk of the testing in the Longitudinal Study involves newly constructed tests, none of which can be made available until the conclusion of the study.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: None, except for the preparation of materials useful in inservice teacher training programs.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: A summer writing session was devoted to revision of the calculus text and others and to a first version of a computing text.

XIX. PLANS FOR THE FUTURE: SMSG has largely finished its task of providing sample curricula for grades K-12. In the future its major efforts will lie in three areas. The first is that of providing closer connections between mathematics and the various areas in which mathematics is used. The second is that of research on the learning of mathematics by students in school. The third is that of providing mathematics curriculum materials suitable for students whose achievement in mathematics is below average.

I. PROJECT TITLE: School Science Curriculum Project

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Gilbert C. Finlay (deceased), Professor of Education, University of Illinois, Urbana, Ill. June, 1963

III. PROJECT DIRECTOR: Richard F. P. Salinger, Research Assistant Professor, Secondary and Continuing Education, University of Illinois, Urbana, Ill.

IV. PROJECT HEADQUARTERS ADDRESS: 805 West Pennsylvania Avenue, Urbana, Ill. 61801

V. PROFESSIONAL STAFF: Gwendolyn Barbour, Biology; Rose Bourgin, Biology; Brian Carss, Geology; Bernard Dodds, Biology; Bernice Epperson, Teacher; Virginia Finlay, Evaluation; George Frost, Physics; Marianne Haney, Anthropology; Nancy Kott, Anthropology; Artha Sue Loy, Linguistics; James W. Porter, Archeology-Geology; Peter Shoresman, Science Education and Director of Research; Robert Thompson, Physics; Charles Weller, Science Education; plus many other scientists, illustrators, and writers.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: University of Illinois
B. Funding agency: National Science Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: To develop improved science materials for elementary and junior high schools via instructional materials for students and teachers.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Science, broadly interpreted. Upper elementary and junior high school.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Running Water and River Development (use of literal model to interpret nature) 5-8
2. Beans and Biology (a study of Heterotrophic Life) 6-9
3. Motion, Photographs & Pendulums (relative motion, frames of reference, evaluation of assumptions) 4-6
4. Short Interval Timer (apparatus paper describing construction, theory, and application) no limit to grade level

X. USE OF PROJECT MATERIALS: Approximately 60 teachers using the program which is not complete at this time. Specific schools where materials are being used: Napa, Walnut Creek, Calif.; Champaign, Sterling, Metropolis, West Aurora, East St. Louis, Danville, Ill.; Norwalk, Greenwich, Conn.; Summit, N. J.; Lakewood, Cincinnati, Ohio; Tampa, Fla.; Baton Rouge, La.; Wilmington, Del.; Ft. Worth, Houston, Texas

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Translation of Beans and Biology into French has been proposed.

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:

5. Control and Feedback
6. Time, Space and Species
7. Planaria
8. Drosophila
9. Ants
10. Matter & Electricity
11. Writing Systems
12. Wooden Aquaria
13. Hatchet Planimeter
14. Animal Adaptation

XIV. MATERIALS AVAILABLE FREE: None

XV. MATERIALS PURCHASABLE: None

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Trials are being made in selected classrooms by regular classroom teachers. Data from teacher-reaction sheets, visitation by Project staff, analyses of entire taped class sessions, teacher tapes, face-to-face interview with teachers, and pre- and post-test for children are being collected. Testing is being limited to a small test population in carefully selected test centers with which the Project maintains close contact. Most out-of-state centers are under supervision of college personnel who work with the Project. Materials are used in a few situations in which feedback arrangements are intensified. Resulting revisions are tried in more varied situations described above.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Limited use of materials in some classes of "science for elementary teachers" at the University of Illinois. Program to be expanded on basis of earlier success.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Summer Study 1965 included a two-week orientation program for twenty-one teachers and administrators from Project Test Centers, and continued development of Project materials by staff and visiting scientists. Evaluation procedures are undergoing refinement and several new Test Centers have been selected. Project work is now heavily concentrated on development of a limited number of the topics originally selected. The grade range to which materials are being directed has been narrowed to include only upper elementary and junior high school.

XIX. PLANS FOR THE FUTURE: Continuation of development and revision of materials described. No writing conferences planned. Publications to be released as completed.

I. PROJECT TITLE: Science Courses for Baccalaureate Education

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Dr. V. L. Parsegian. September, 1964

III. PROJECT DIRECTOR: Dr. V. L. Parsegian, Rensselaer Professor

IV. PROJECT HEADQUARTERS ADDRESS: Rensselaer Polytechnic Institute, Troy, N. Y. 12181

V. PROFESSIONAL STAFF: Many participants from RPI and other colleges. Advisory Board composed of: David G. Barry (State Univ. of N. Y.); Loren Eiseley (Univ. of Pennsylvania); Harry W. Jones (Columbia University); Adolph Lowe (New School for Social Research); Henry Margenau (Yale Univ.); Ernest Nagel (Columbia Univ.); Walter J. Bauer (Rensselaer Polytechnic Institute); Ronald A. H. Mueller (Rensselaer Polytechnic Institute).

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Initiated largely as effort of individuals rather than of organizations.
B. Funding agency: Grant from Charles F. Kettering Foundation.

VII. SPECIFIC PURPOSES AND OBJECTIVES: A four-semester (12 credit hour) introduction to the sciences for college freshmen and sophomores who plan careers in law, business, government, economics, art, theology, anthropology, psychology, etc. The course emphasizes concepts, methods, and interrelationships of the sciences, with somewhat historical, and largely non-mathematical approach. Several themes persist through the two years, including: (a) energy aspects of nature; (b) the capabilities and limitations of science and scientific methodology; (c) the statistical and probability characteristics of natural phenomena; (d) the "systems" or interrelated, co-operative, engineering aspects of nature, including feedback, control, cybernetics concepts, and (e) the knowns and unknowns of nature and trends in scientific development.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: The course is designed for college freshmen and sophomores. It encompasses materials selected from physics, chemistry, earth science, astronomy, mathematics, biology, social science.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION: Textbooks, a Teacher's Manual, and a Laboratory Manual, are in preparation.

X. USE OF PROJECT MATERIALS: Two pilot classes are currently in progress at Rensselaer Polytechnic Institute and at Russell Sage College. More are to be initiated in September 1966.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: None listed

XIV. MATERIALS AVAILABLE FREE: Progress Reports by request to the Director.

XV. MATERIALS PURCHASABLE: None as yet.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Pilot classes are now in progress and will continue through the next several years. The Advisory Board and associates, as well as the classes of students, are all participating in the evaluation.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: We plan 6-week summer work sessions for the teachers who will begin the program at their own schools.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: In addition to the pilot classes, the project conducted a conference session in Berkeley, California, in connection with the annual meeting of the American Association for the Advancement of Science.

XIX. PLANS FOR THE FUTURE: There will continue to be conferences in conjunction with the AAAS meetings, and extensive informal work and conferences at RPI throughout the year.

I. PROJECT TITLE: Science Curriculum Improvement Study

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Robert Karplus, Professor of Physics, University of California, Berkeley, Calif. 1961

III. PROJECT DIRECTOR: Robert Karplus

IV. PROJECT HEADQUARTERS ADDRESS: Science Curriculum Improvement Study, Department of Physics, University of California, Berkeley, Calif.

V. PROFESSIONAL STAFF: Herbert D. Thier, Assistant Director; Chester A. Lawson, Director of Development in Life Sciences; Joseph Davis, Jr., Chemist; John Denzler, Designer; James Eakin, Schools Coordinator; Sandra Fletcher, Junior Biologist; Christina Kageyama, Teacher; Jane Bock, Senior Biologist; Erika Kunkel, Senior Biologist; Judith Lieberman, Junior Biologist; Patricia Ness, Psychologist; Sidney Strauss, Biologist and Educator; Patricia Summers, Teacher; Luke Steiner, Visiting Research Chemist; Celia Stendler, Visiting Research Psychologist

VI. PROJECT SUPPORT:
A. Organizational sponsorship: None
B. Funding agency: National Science Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: The Study is exploring a concept of science education based on communicating scientific literacy. The large scale organization of the curriculum is determined by the structure of science, by the maturity of the pupils, and by the pupils' preconceptions. The small scale organization of individual lessons is determined by the discovery method of concept development and by the needs of the learners.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Science Education, Grades K-6

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Variation and Measurement. A science unit for the primary grades
2. Systems. A science unit for the primary grades
3. Interaction. A science unit for the primary grades
4. Relativity of Position and Motion. A science unit for the primary grades

5. Subsystems. A science unit for the primary grades
6. Theoretical Background of the Science Curriculum Improvement Study
7. Material Objects. A science unit for the primary grades. (Out of print)
8. Interaction and Systems. A science unit for the primary grades. (Out of print)
9. One Physicist Looks at Science Education. (Out of print)

X. USE OF PROJECT MATERIALS: Thirty-five teachers are using the complete program and sixty teachers are using portions of it. Specific schools where materials are used: Berkwood, LeConte and Washington Schools, Berkeley, Calif.; Glorietta School, Orinda, Calif.; Madera School, El Cerrito, Calif.; New York Trial Center Schools: The Agnes Russell School; P.S. 125; P. S. 145; Quarles and Cleveland Schools, Englewood, N. J.; Walter Stillman and Ralph Maughaum Schools, Tenafly, N. J.; Oklahoma Trial Center schools: Norman Public Schools; Adams, Cleveland, Jackson, Jefferson, Lindoln, Madison, Monroe, McKinley, Wilson, Okla.; John Tyler School, Oklahoma City, Okla.; Hawaii Trial Center schools: Noelani School; Manoa School; Kahala School; Kaahumanu School; Aliiolani School; University Elementary School; Los Angeles Trial Center Schools: University Elementary School

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:
10. Temperature
11. Ice Calorimetry. (Includes Temperature and Energy)
12. Measurement and Uncertainty. (Revision of Variation and Measurement)
13. State of a System
14. Change of Phase. (Includes Solutions)
15. Kindergarten Program. Revised
16. Relativity of Position and Motion. Revised
17. Life Science - 1
18. Life Science - 2
19. Material Objects. Preliminary commercial version

XIV. MATERIALS AVAILABLE FREE: Mailing list for Newsletters and reprints.

XV. MATERIALS PURCHASABLE: Nos. 1, 2, 3, 4, 5, $1.50 ea.; No. 6, $1.00. All units include both teacher's and student manuals. No. 7 (preliminary commercial version) available from D. C. Heath and Company; contact them for pricing and other information.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: These trial version materials are used in the four public and one private elementary schools working with the project for a period of two or three years. Teachers' oral evaluation, staff visits, interviews with children, and written reactions will lead to a preliminary commercial version to be tried and evaluated in four nationwide centers. All testing to this point has been of the practicum type where the children are given specific tasks to carry out in relation to the unit studied. Evaluation materials are designed to meet specific purposes such as providing information used in the review of a trial version and/or measuring the effectiveness of a unit. The techniques, materials, and sample size may vary according to the purpose.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Orientation and evaluation conferences are held with the teachers after each unit. In September all teachers attended a three-day orientation conference. Project staff members visit each teacher once a week. At the trial center level, a teacher education program is being developed under the direction of Willard Jacobson, Teachers College, Columbia University. For further information on this program, interested parties should contact Professor Jacobson.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Work is continuing on the production of physical science materials in primary grades. Some of these are now available in a trial version (as detailed in IX). Exploratory work is taking place on the primary grade Life Science program and on the upper grade physical science program. Preliminary commercial version of Material Objects will be available in September, 1966, for schools wishing to gain experience with the program.

XIX. PLANS FOR THE FUTURE: The preliminary commercial version of Material Objects - which will appear in September of 1966 - will be followed by materials for additional grade levels on the basis of approximately one grade a year. Further information regarding this program is available from D. C. Heath and Company. Work is continuing on a development of the upper grade physical science program and on the primary life science program. Extensive research in development is being carried out in teacher training and evaluation programs.

I. PROJECT TITLE: Science Manpower Project (Teachers College, Columbia)

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: Teachers College Staff, Columbia University, New York, New York 10027. 1956

III. PROJECT DIRECTOR: Frederick L. Fitzpatrick, Executive Officer

IV. PROJECT HEADQUARTERS ADDRESS: Teachers College, Columbia University, New York, New York 10027

V. PROFESSIONAL STAFF: Willard J. Jacobson, Associate Director, same address

VI. PROJECT SUPPORT: 34 American industries

VII. SPECIFIC PURPOSES AND OBJECTIVES: The improvement of science instruction in the schools

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Elementary science (K-6); Junior High School Science (7-9); Biology, Chemistry, Physics (10-12)

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:

1. A Guide to Engineering Education, 1958
2. Attitudes of Certain High School Seniors Toward Science and Scientific Careers, 1959
3. Problem Solving Methods in Science Teaching, 1960
4. Policies for Science Education, 1960
5. Modern High School Biology, 1959
6. Modern High School Chemistry, 1960
7. Modern Junior High School Science, 1961
8. Modern Elementary School Science, 1961
9. The High School Seniors: Two Years Later, 1961
10. Modern High School Physics, 2nd edition, 1962
11. Electron Micrographs in the Teaching of Biology, 1962
12. Dimensions, Units and Numbers in the Teaching of Physical Science, 2nd edition, 1962
13. The Earth in Space, 1965

X. USE OF YOUR PROJECT MATERIALS: There are no records being kept.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGE(S) INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None described

XIII. MATERIALS PRESENTLY BEING DEVELOPED:
14. The Earth Around Us

XIV. MATERIALS AVAILABLE FREE: None

XV. MATERIALS PURCHASABLE:
1. $1.00
2. $1.25
3. $1.50
4. $3.95
5. $1.50
6. $1.50
7. $2.00
8. $2.25
9. $1.50
10. $1.50
11. $1.25
12. $1.00
13. $3.50

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: These are not materials that you evaluate. Items 5, 6, 7, 8, and 10 are guides to the revision of the science education curriculum. Item 7 is a guide for school administrators. Items 1, 3, 9, 11, and 12 are guides for science teachers.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: None, except recommendations set forth in Policies for Science Education.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: These have largely been concerned with the preparation of resource books for teachers of elementary science.

XIX. PLANS FOR THE FUTURE: Additional resource books for teachers.

I. PROJECT TITLE: Secondary School Science Project

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: F. L. Ferris, Jr. and F. L. Friedman. September, 1962

III. PROJECT DIRECTOR: Frederick L. Ferris, Jr.

IV. PROJECT HEADQUARTERS ADDRESS: Princeton University, 171 Broadmead Avenue, Princeton, N. J. 08540

V. PROFESSIONAL STAFF: Sheldon Judson, Principal Investigator; George J. Pallrand, Executive Director; Lois B. Arnold, Professional Associate; Arnold M. Goldstein, Editor-Writer; Mymon Goldstein, Test Development; Peter S. Howell, Coordinator, Teacher Training; Charles G. Kulick, Design-Development Specialist; David R. Lawrence, Professional Associate; Helen M. Markham, Professional Assistant; James F. Murphy, Administrator

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Princeton University
B. Funding agencies: National Science Foundation, Princeton University

VII. SPECIFIC PURPOSES AND OBJECTIVES: To develop a science curriculum for use at the secondary school level, flexible in structure, inclusive of student, teacher, and classroom materials; to develop testing and evaluation measures, and to prepare a training program for teachers.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: The physical sciences (geology, astronomy, physics, chemistry, mathematics). Grades VIII - IX

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Student Investigations (1 through 9)
2. Teacher Folios (1 through 9)
3. Science Reading Series (1 through 15)
4. Records for the Teacher (1 through 2)
5. Course Description Book 1
6. Progress Reports (1 through 4)
7. Student, teacher, classroom equipment and supplies

X. USE OF PROJECT MATERIALS: 113 teachers are using the complete program and 5 additional teachers are using a portion of it. Specific schools where materials are used: Rio Linda Senior High School, Rio Linda, Calif.; University of Chicago Laboratory School, Chicago, Ill.; Warren Jr. High School, Newton, Mass.; Nova High School, Ft. Lauderdale, Fla.; Junior High School No. 4, Trenton, N. J.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Unknown but translation has project support.

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED:
8. Student Investigations (10)
9. Teacher folios (10
10. Science Reading Series (10)
11. Records for the teacher (4)
12. Course description book (2) - one revised
13. Progress report V
14. Student, teacher, classroom equipment and supplies

XIV. MATERIALS AVAILABLE FREE: Request to project, attention: Helen Markham.
5. Course Description Book
6. Progress Report 4, only

XV. MATERIALS PURCHASABLE: Write Webster Division, McGraw-Hill Book Company, Manchester, Mo. Publications and equipment (one year's course materials) available beginning September 1966.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Day to day use in a wide variety of secondary schools; frequent meetings of area coordinators and teachers; school visits by project staff; written reports from teachers, coordinators, school administrators; advisory meetings, committee of Princeton University scientists. Under development in two segments: (1) Tests to determine the extent to which the course has reached its objectives; (2) Tests to evaluate the development of students as they proceed through the course. Preliminary versions of tests have been printed for administration and scoring during the period April-September, 1966.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: McGraw-Hill Book Company will support a teacher orientation session on the Princeton Campus in August, 1966. This will be the model for other regional sessions that will introduce "Time, Space, and Matter" to new teachers. Details may be obtained from Webster Division, McGraw-Hill Book Company, Manchester, Mo.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: After a meeting with all interested publishers in June, 1965, McGraw-Hill Book Company was chosen to market one year's course materials. Preliminary versions of publications and equipment are being revised for use beginning September 1966. The results of a test of the ability of 30 new teachers to use the course materials (1965-66) with no previous formal training are being evaluated in formulating teacher training programs.

XIX. PLANS FOR THE FUTURE

1. Completion of materials for commercial release, Part I, of the "Time, Space, and Matter" curriculum
2. Further develop and test materials on the make-up and history of the earth
3. Develop and refine curricular materials in the area of teacher training through cooperative arrangements with teacher training institutions
4. Develop reliable methods of testing and evaluating the content and methods contained in the "Time, Space, and Matter" curriculum
5. Advise and assist the publisher in teacher training programs

I. PROJECT TITLE: Study of a Quantitative Approach in Elementary School Science

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: Clifford E. Swartz and Ben Werner, Jr. June, 1964

III. PROJECT DIRECTOR: Clifford E. Swartz

IV. PROJECT HEADQUARTERS ADDRESS: Physics Department, State University of New York, Stony Brook, N. Y.

V. PROFESSIONAL STAFF: Clifford E. Swartz, Associate Professor of Physics

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Research Corporation, State University of New York.
B. Funding agency: National Science Foundation, until October, 1965.

VII. SPECIFIC PURPOSES AND OBJECTIVES: We wrote about 70 science lessons on natural science topics, which were based on measurement and quantitative analysis. These were tried in local schools.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Grades 1-6

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION: A report and complete copies have been filed with National Science Foundation.

X. USE OF PROJECT MATERIALS: Thirty teachers are using the complete program and 20 others are using some of the materials. Schools where the materials are used: Brentwood and South Huntington, New York.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: About 200 lessons so far, with 50 additional contemplated. These will be published commercially.

XIV. MATERIALS AVAILABLE FREE: A statement of the guidelines and a sampler containing lessons at four grade levels.

XV. MATERIALS PURCHASABLE: None at present.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: During the trial year, teachers filled out report forms for each lesson. The complete account and analysis was filed with National Science Foundation.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Deliberately none--one of the purposes of the project was to develop material which could be used by teachers without any special training.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: Publication of the new series of about 250 lessons, K-6, will complete the project.

I. PROJECT TITLE: Teacher's Automated Guide (TAG)

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: Donald Stotler, Supervisor of Science, Portland Public Schools. June, 1964

III. PROJECT DIRECTOR: George Ingebo, Director Education Research, Portland Public Schools

IV. PROJECT HEADQUARTERS ADDRESS: Portland Public Schools, 631 N.E. Clackamas Street, Portland, Ore.

V. PROFESSIONAL STAFF: Thomas Crowder, Project Coordinator; Robert Coffin, Director of Experimental Programming; Genevieve Mattoon, Curriculum Consultant

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Portland Public Schools
B. Funding agency: Louis W. and Maud Hill Family Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: To use the computer potentials for: random access memory, ability to rapidly combine many bits of information as a professional tool for helping teachers, select from curriculum alternatives, and list all the information sources relative to planning an activity and the supplies needed.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Science K-3 for 2 years Pilot Program (1966-1968). K-12 for 3-year experiment (1968-1971).

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Science Teachers' Adaptable Curriculum (STAC) curriculum materials on Keysort cards (see 1964 and 1965 editions of AAAS Clearinghouse);
2. A special deck of STAC cards has been prepared by gluing sections of the first four volumes of AAAS Science-A Process Approach on Keysort cards (this cross-indexed deck serves as a "hand computer").

X. USE OF PROJECT MATERIALS: All teachers at Rice Elementary School using "hand computer" of AAAS materials full time. All teachers at Wilcox Elementary School using "hand computer" part-time.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE

PRINTED IN TRANSLATION: English

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: 3. Work toward automated unified science materials for K-12 grades.

XIV. MATERIALS AVAILABLE FREE: Descriptive only

XV. MATERIALS PURCHASABLE: None

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Comparisons of pupils' performances will be made starting with a three-year experiment in 6 elementary schools and 1 high school, involving teacher supervision and consultant subjective judgments. A diagnostic type test is being developed. Extensive observation of pupils' behavior will be made. Comparison is to be made using extensive in-service training of both experimental and control teachers. Analysis of effects of some pupil characteristics and some learning conditions will be attempted.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: (1) Intern type training of some teachers in the use of remote stations; (2) In-service classes; (3) Professional meetings; (4) Within school organized study plan.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: As an extension of the STAC Committee, a Cybernetics Committee was formed in September 1964. The committee developed the "hand computer", being used experimentally at Rice School, in the summer of 1965. A Regional Advisory Committee, chaired by Superintendent Melvin Barnes, and represented by local colleges and science related industries and agencies has been formed. A Communications and Records Committee is working on the problem of automating the storage and retrieval of student data. A Research Committee is planning the experimental design for a five-year period. In-service programs funded by the Carnegie Foundation have been educating teachers in the use of the newer approaches in science, especially the AAAS Science - A Process Approach.

XIX. PLANS FOR THE FUTURE: Funds to extend the grant from the Louis W. and Maud Hill Family Foundation are being requested. A five-year, month-by-month, projection of the experiment design is being devised.

I. **PROJECT TITLE:** Teaching Mathematics Through the Use of a Time-Shared Computer

II. **PRINCIPAL ORIGINATORS:** Owen B. Kiernan and Jesse O. Richardson

III. **PROJECT DIRECTOR:** Jesse O. Richardson, Senior Supervisor in Education, Massachusetts Department of Education

IV. **PROJECT HEADQUARTERS ADDRESS:** Computer Mathematics Project H-212, c/o Bolt Beranek and Newman Inc., 50 Moulton Street, Cambridge, Mass. 02138

V. **PROFESSIONAL STAFF:** Wallace Feurzeig, Coordinator; Walter Koetke, Field Supervisor; James Pender, Field Supervisor; Lucille Darley, Field Consultant; Richard Kahan, Field Consultant; Vincent Sharkey, Field Consultant; Paul Castleman, Computer System Supervisor; Jonathan Cole, Computer System Supervisor; Consultants: G. Octo Barnett, M.D.; Stanley J. Bezuszka, S.J.; Richard H. Bolt; William Bossert; Robert Fano; W. Eugene Fergusson; Hiram Haggett; Evan Herbert; Anthony Oettinger; David Page; Richard Pieters; Programmers: Robert Donaghey; Richard Grant; John Hey; Cynthia Solomon

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Board of Education, Commonwealth of Massachusetts
B. Funding agency: U. S. Office of Education

VII. SPECIFIC PURPOSES AND OBJECTIVES: A major problem in the field of mathematics education is the development of new teaching tools. This proposed study has as its basic goal the development of a mathematical laboratory based on a time-shared digital computer. In working towards this goal we will focus on solving the following problems: (1) how can a time-shared computer be programmed to act as a useful tool for teaching mathematics; (2) how can classroom teachers be taught the necessary techniques to enable them to use this new teaching tool successfully; and (3) how can such multiple-user computer facilities be developed in line with economic constraints.

Objectives: In addition to demonstrating the economic feasibility of this new approach, we plan to test our hypotheses that:

1. a terminal teletypewriter connected to a large computer operated in the time-shared mode will give the mathematics student the feeling of working on his own computer;
2. having the computer on an "always ready" basis will encourage students to engage extensively in voluntary extracurricular use of the computer terminals;
3. the presence of a continuously available real-time computer in the classroom will lead students to acquire a more thorough grasp of mathematics as measured by standard achievement tests.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Mathematics curriculum at grades six, nine, eleven

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Computer-oriented curriculum materials are now under development as part of the program of the project.
2. Monthly CAM (Computer-Assisted Mathematics) Newsletter.

X. USE OF PROJECT MATERIALS: Ten teachers are using the complete program and twenty others are using portions of it. Schools where the course is being taught include: Phillips Academy, Andover; Winn Brook School, Belmont; Payson Park School, Belmont; Brookline High School, Brookline; J. S. Kendall School, Belmont; Lexington High School, Lexington; Westwood High School, Westwood; and Vinson-Owen School, Winchester (all in Mass.)

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: None listed

XIV. MATERIALS AVAILABLE FREE: Request from Project Director

XV. MATERIALS PURCHASABLE: None available

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Pre-test and post-test given to experimental and control classes in participating schools.

The value of this experiment cannot be measured exclusively by statistical gains on one or more psychometric instruments; such evaluation can, however, be used for exploring the types of impact resulting from the program, as for example:

1. increased student knowledge about mathematics;
2. increased student knowledge about digital computers;
3. changed student attitudes towards the role of the computer in our society;
4. opinions, either positive or negative, among teachers, school administrators, and parents, about the value, and advisability of a computer-oriented mathematics program.

Quantitative information about student change can tell us more than whether or not the program is achieving its goals; it can give us information (by means of item analysis etc.) on how to modify procedures to strengthen various aspects of the program.

The following criterion measures to be applied to all classes appear most suitable:

1. a mathematics achievement test for the computer-oriented curriculum (to be developed);
2. Sequential Test of Education Progress (STEP), mathematics form 3A for grades 6 and 9; form 2A for grade 11.

The Relation of Student Involvement to Various Criteria

Assuming we find that our treatment affects one or more of the criteria, we may then look at the relation between the degree of student involvement during the course and student standing. The time-shared computer provides a means for keeping a detailed cumulative record of the students' performance and behavior. For example, records may quite easily be kept as to the amount of time the student uses the computer and the frequency variation of his errors as he progresses.

To observe how the amount of time the student puts in affects his criterion measure, we may wish to look at several partial correlations, such as:

1. the relation between time used and post-test results, when IQ and pre-test results are held constant;
2. the relation between prior attitude towards the program and computer time used, when controlling for IQ and pre-test.

Many such relations will be found interesting and important. For example, the first relation may tell us something about the importance of "exposure"; the second may suggest whether or not pre-disposition is related to the degree to which the student applies himself to the study. In addition, we might wish to gather information on whether the intervention of this course adversely affects students' grades in other courses.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: A group of 30 educators, teachers from the participating schools involved in the teaching of mathematics at both elementary and secondary school levels, scientists involved in the time-shared use of computers, and members of the project advisory board was assembled for a 6-week session. This work aimed to:
1. teach the mathematics teachers the fundamentals of computer usage and the potentials of a real-time computer in the mathematics and science classroom;
2. review and improve the curriculum units developed for the classes using the computer;
3. evaluate the results of the pilot phase of the experiment conducted during the spring semester of 1965;
4. establish a teacher's user-group to write and share programs over the course of the study;
5. thoroughly test the computer programs developed during the initial phase of the experiment;
6. develop new computer programs to be used during the school year 1965-1966.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Not previously reported.

XIX. PLANS FOR THE FUTURE: The summer study session will produce a set of curriculum units and a brief write-up of the educational computer terminal itself. These write-ups will form the basis on which the continuing meetings and the Newsletter will operate during the school year. We expect that as experience is gained with the curriculum units, new techniques will be developed for teaching symbolic logic, set theory, and other aspects of modern school mathematics. These techniques will be described in the interim report and in special publications issued during the course of the project.

A final report of the project will be published, which will include:

- a description of the time-shared computer system used;
- a description of the computers that are simulated at the terminals;
- a description of the programming systems made available through the terminals;
- the curriculum units developed during the program;
- the tests developed for evaluation of achievement in computer study;
- the results of all tests given and an interpretation of their statistical significance.

I. PROJECT TITLE: University of Illinois Arithmetic Project at Educational Services Incorporated

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: David A. Page and Jack Churchill. 1958, Univ. of Ill.

III. PROJECT DIRECTOR: David A. Page

IV. PROJECT HEADQUARTERS ADDRESS: University of Illinois Arithmetic Project, Educational Services Incorporated, 372 Main Street, Watertown, Mass. 02172

V. PROFESSIONAL STAFF: Jack Churchill, Associate Director and Editor; Lisa Koch, Assistant Director; George B. Rochfort, Jr., Project Coordinator
Demonstration and film teachers: Phyllis R. Klein; Lucille Mueller; Lee Osburn; Susan Smullin; Carolyn Teixeira; Mary Turner
Academic resource staff members: Doris Axelrod; Sally Agro; Edward T. Esty, II

VI. PROJECT SUPPORT:
A. Organizational sponsorships: Jointly sponsored by the University of Illinois and Educational Services Incorporated
B. Funding agencies: Carnegie Corporation, Ford Foundation, Educational Services Incorporated, National Science Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: To create a course on film and on paper in mathematics and its teaching, for inservice elementary school teachers, which can be used successfully even if there is not available an instructor with special mathematics competence.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Mathematics, principally grades 1 through 6, but with increasing interest in the curriculum for children before the first grade as well as for students beyond the 6th grade.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. General Information
2. *Ways to Find How Many*
3. *Do Something About Estimation*
4. *Arithmetic with Frames*
5. *Teaching Creativity in Mathematics*
6. *Number Lines for the Orbiting Atomic Teacher*
7. *Well-Adjusted Trapezoids*

8. A First-Grade Sample
9. Maneuvers on Lattices
10. Number Lines, Functions, and Fundamental Topics (a relevant book not specifically project work)

X. USE OF PROJECT MATERIALS: Over the past eight years, more than 22,000 teachers have requested all available materials from the project. Several hundred teachers have received intensive instruction for several weeks or more. At present, the emphasis is upon production of the courses mentioned above which will permit large-scale communications with teachers throughout the country. Schools where the course is being taught include: many of the schools in Watertown, Concord, Wellesley, Newton, Framingham, and Dorchester, Mass., and Principia School, St. Louis, Mo.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None listed

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: A full 30-week course with a meeting each week of at least 2 hours, and approximately 3 more hours devoted to homework consisting of motion-picture films and written material intended for elementary school teachers.

XIV. MATERIALS AVAILABLE FREE: Free in small quantities: 1, 2, 3, 4, 5, 6, 7, 8 and 9.

XV. MATERIALS PURCHASABLE: No. 10 is available from the publisher, Macmillan Company, 60 Fifth Avenue, New York, N. Y. List price: $3.80. Maneuvers on Lattices & Ways to Find How Many (reprints) in quantities over 20 copies are available at 20 cents per copy.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Authority and direction for evaluation of all project activities reside with the Steering Committee. Until recently, evaluation has been carried out by direct observation and trial of materials and ideas by a variety of teachers on the project staff with a variety of different kinds of classes. The most objective external evaluation, soon to be required, is now being mapped-out under the direction of the

Steering Committee.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: The project feels that significantly different classroom-tested material can generally be taught well only by those teachers who have had intensive preparation. Consequently, most of its present activities are directed toward the courses for teachers mentioned above.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: The project has survived its move from Urbana, Ill., has added staff members, and experimented with the filming of classes of children learning mathematics--resulting in two successful, though not yet distributed, films as well as several additional films which are presently nearing completion. The project has given 16-week institutes in Concord, Newton, Wellesley, and Framingham, Mass., and in both Newton and Framingham has offered advanced sessions as a continuation of the 16-week initial course. Presently, as part of the experimental trial, 300 students in Watertown, Mass., and 120 students in Dorchester, Mass., are being taught mathematics by project staff members.

XIX. PLANS FOR THE FUTURE: Plans for the future include continuing work on the course for teachers and beginning work on three further courses to follow Course One. These courses will be adapted for use in university courses for future teachers, and for institutes for university teachers who are concerned with the training of potential elementary school teachers.

I. PROJECT TITLE: University of Illinois Committee on School Mathematics (UICSM)

II. PRINCIPAL ORIGINATORS: Colleges of Education, Engineering, and Liberal Arts and Sciences of the University of Illinois

III. PROJECT DIRECTOR: Max Beberman, Professor of Education, University of Illinois, Urbana, Ill. 61801

IV. PROJECT HEADQUARTERS ADDRESS: 1210 West Springfield, Urbana, Ill.

V. PROFESSIONAL STAFF: Approximately 30 academic staff, all of whom hold rank in the University of Illinois Colleges of Education or Liberal Arts and Sciences.

VI. PROJECT SUPPORT:
A. Organizational sponsorship: University of Illinois
B. Funding agencies: Carnegie Corporation of New York (until June, 1962); U. S. Office of Education, (until December, 1964); National Science Foundation (1962-present).

VII. SPECIFIC PURPOSES AND OBJECTIVES: Preparation of and experimentation with materials for junior and senior high school mathematics courses; research on learning theory and its relation to the teaching of mathematics; retraining of mathematics teachers to enable them to take advantage of modern mathematics programs.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Mathematics, grades 7 - 12.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. UICSM High School Mathematics, Units 1-11 (including teachers' commentaries)
2. Examinations for Units 1-6
3. Teacher-training films - demonstrations of a class studying the UICSM 9th grade course (soon available through a commercial distributor)
4. Self-instructional texts on solid geometry, logic, introduction to algebra.

X. USE OF PROJECT MATERIALS: The course is being taught in Pascack Valley Regional High School, N. J.; Newton High School, Newtonville, Mass.; Los Angeles City Schools, Los Angeles, Calif.; Catholic and Parochial Schools in Boston and Pittsburgh.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Spanish and French

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: 5. 7th and 8th grade materials for underachievers in culturally deprived areas.

XIV. MATERIALS AVAILABLE FREE: None available from item listings above. Reprints of articles written by staff available upon request.

XV. MATERIALS PURCHASABLE:
1. UICSM High School Mathematics, Units 1-11 (individual units)
UICSM High School Mathematics, Course 1 (revised Units 1-4)
UICSM High School Mathematics, Course 2 (revised Units 6 and 9)
UICSM High School Mathematics, Course 3 (revised Units 5, 7, 8 and 9)
(available from D. C. Heath and Company, text distributor)
2. Available from D. C. Heath and Company
3. Unavailable at present time
4. Available through UICSM Project, 1210 West Springfield, Urbana, Ill.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Teachers and classroom observers file detailed written reports of classroom activities on the 7th and 8th grade materials. These, together with achievement test results, form the basis for revision of the materials. Standardized tests of skills with the arithmetic of rational numbers (the main topic of our 7-8th grade materials) are administered both as pre-tests and post-tests. Project designed achievement tests to detect attainment of specific content objectives are employed.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Teachers of trial classes attend three-week summer training sessions.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: 7th grade materials on the arithmetic of rational numbers were tried in classes in central-city schools in 6 of the nation's most populus metropolitan areas. Many of these same students will be using 8th grade materials on an intuitive study of the geometry of a plane during the 1966-67 school year. Additional students in those same cities will be beginning the 7th grade materials.

Vector geometry materials for the 10th grade were tried for the first time outside Champaign-Urbana, Illinois. A similar training conference for teachers of vector geometry will be conducted in Urbana during the summer of 1966.

XIX. PLANS FOR THE FUTURE: Revision of existing 7-8th grade experimental materials; revision of UICSM *High School Mathematics*, *Course 4* (Units 10 and 11). All writing takes place at project headquarters and by staff members. Project planning is a responsibility of the project director who is aided by the UICSM Advisory Board of prominent mathematicians.

I. PROJECT TITLE: University of Illinois Elementary-School Science Project

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: University of Illinois. September, 1960

III. PROJECT DIRECTORS: J. Myron Atkin, Professor of Science Education, and Stanley P. Wyatt, Jr., Professor of Astronomy

IV. PROJECT HEADQUARTERS ADDRESS: 805 West Pennsylvania Avenue, Urbana, Illinois 61801

V. PROFESSIONAL STAFF: Benjamin F. Peery, Astronomer; Henry Albers, Astronomer; Karlis Kaufmanis, Astronomer; Gibson Reaves, Astronomer; Helen W. Pierce, Editor; Robert A. von Neumann, Illustrator; JoAnn Stecher, Research Associate; Alvin Hertzberg, School Science Supervisor; Bernard E. Nurry, School Science Supervisor; Fred R. Wilkin, School Science Supervisor; Peter B. Shoresman, Assistant Professor of Science Education; and Roy A. Gallant, Science Writer

VI. PROJECT SUPPORT:
A. Organizational sponsorship: University of Illinois
B. Funding agency: National Science Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: Production of astronomy materials that are sound astronomically, that reflect the structure of the subject as it is viewed by astronomers of stature, and that can be handled by teachers and children in actual classrooms.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Astronomy, Grades 5 - 8

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Charting the Universe, Children's Book, Third Edition, 1963. This book covers such topics as measurement, distances in the solar system and beyond, the size and shape of the earth, and inverse square law applied to light as a tool for determining great distances.
2. Charting the Universe, Teacher's Guide, Third Edition, 1963.
3. The Universe in Motion, Children's book, Second Edition, 1963. This book outlines conceptual models to account for observed motion.
4. The Universe in Motion, Teacher's Guide, Second

Edition, 1963.
5. Gravitation, Children's Book, Fourth Edition, 1965. This book deals with such concepts as velocity, acceleration, mass and force.
6. Gravitation, Teacher's Guide, Fourth Edition, 1965.
7. The Message of Starlight, Children's Book, Second Edition, 1965. The focus is on methods astronomers use in analyzing starlight to obtain information about the composition of stars.
8. The Message of Starlight, Teacher's Guide, Second Edition, 1965.
9. The Life Story of A Star, Children's Book, First Edition, 1965. This book delves into certain areas of thermodynamics. Its essential theme of stellar evolution emphasizes how astronomers make inferences about the birth, growth, and death of a star.
10. The Life Story of A Star, Teacher's Guide, First Edition, 1965.
11. Galaxies and the Universe, Children's Book, First Edition, 1965. This book introduces the student to reasonable explanations of the beginning, growth, and possible death of our universe. This includes classifying galaxies as to appearance and how this information helps to determine theories of galactic evolution.
12. Galaxies and the Universe, Teacher's Guide, First Edition, 1965.

X. USE OF PROJECT MATERIALS: 250 teachers are using the complete program in such schools as: Sacramento, Calif.; Elgin, Ill.; Norwalk, Conn.; Havertown, Pa.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: Portuguese

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: Certain books are being revised

XIV. MATERIALS AVAILABLE FREE: None

XV. MATERIALS PURCHASABLE: All titles at $1.50.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Written achievement tests plus observational scales are used. The Project is also experimenting with evaluation of effective outcomes. Tests have been prepared for all books. Attempts are being made to identify outcomes of the Project by extensive observation in classrooms.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: None

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: A summer writing conference was conducted in 1965 during which time the final books in the series were prepared in first draft form.

XIX. PLANS FOR THE FUTURE: The last writing conference is to be held during 1966. Activities in the Project after that date will concentrate upon broad evaluation questions related to this and other course content improvement projects.

I. PROJECT TITLE: University of Maryland Mathematics Project (UMMaP)

II. PRINCIPAL ORIGINATOR AND DATE OF PROJECT INITIATION: University of Maryland, College Park, Md. 20740
1957

III. PROJECT DIRECTOR: John R. Mayor

IV. PROJECT HEADQUARTERS ADDRESS: University of Maryland Mathematics Project, University of Maryland, College Park, Md. 20740

V. PROFESSIONAL STAFF: James H. Henkelman, Associate Director; Stanley B. Jackson, Professor of Mathematics, Principal Consulting Mathematician; Henry H. Walbesser, Jr., Assistant Professor; Bruce Tuckman, Associate Professor, Home Economics Psychology, Douglass College, New Brunswick, N. J.; Mildred B. Cole, Lecturer

VI. PROJECT SUPPORT: 1957-60: Carnegie Corporation; 1962-65: National Science Foundation; Present: Self-sustaining

VII. SPECIFIC PURPOSES AND OBJECTIVES: Production of significant and stimulating mathematics course materials for the junior high school student. Research in studies in learning using mathematical materials especially prepared by the staff for this purpose. Production of experimental courses in algebra and geometry for elementary teachers.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Mathematics for the junior high school. Programmed units in mathematics for elementary and junior high schools. (System of Integers under Addition, Non-metric geometry.) Mathematics for elementary school teachers.

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Mathematics for the Junior High School, Book I, 1959. (A new approach to the study of arithmetic, intuitive geometry, and elementary algebra)
2. Mathematics for the Junior High School, Book II, 1961. (See note, #1)
3. Mathematics for Elementary School Teachers, Book I, 1964. (A development of the number systems used in elementary school through the use of conjecture and then deductive proof.)

4. Mathematics for Elementary School Teachers, Book II, 1965. (A development similar to #1 in geometry.)

X. USE OF PROJECT MATERIALS: Ten teachers are using elementary materials. The number using junior high materials is unknown. Mathematics for Elementary School Teachers used for required courses at the University of Maryland.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: None

XIV. MATERIALS AVAILABLE FREE: Not listed above: Psychological Monograph #526, Robert M. Gagne, John R. Mayor, Helen L. Garstens and Noel E. Paradise, "Factors in Acquiring Knowledge of a Mathematical Task," 1962. Limited Supply

XV. MATERIALS PURCHASABLE:
1. Student's Text, \$3.25; Answer Book, \$2.00
2. Student's Text, \$3.25; Teacher's Guide, \$2.00
3. Manual, \$2.50
4. Manual, \$2.50

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: Nos. 1 and 2, materials tested in Washington, D. C.; Arlington, Va.; Montgomery County and Prince George's County, Md. A comparison of the success of students in the UMMaP courses and in the traditional courses was made. A measure of achievement on a test covering the UMMaP course and a measure of achievement on traditional mathematics tests were utilized. Results of the evaluation revealed that students in the UMMaP courses did as well on traditional tests as students in the traditional courses and a great deal better on the tests measuring achievement in the UMMaP course.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: Teachers using UMMaP materials in the try-out centers were given special in-service instruction.

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: Continuation of learning studies.

XIX. PLANS FOR THE FUTURE: None

I. PROJECT TITLE: Writing and Testing a Textbook and a Teachers' Commentary for a Tenth-Year High School Course in Modern Coordinate Geometry

II. PRINCIPAL ORIGINATORS AND DATE OF PROJECT INITIATION: Robert A. Rosenbaum and Harry Sitomer. June, 1964

III. PROJECT DIRECTOR: Robert A. Rosenbaum

IV. PROJECT HEADQUARTERS ADDRESS: Wesleyan University, Middletown, Conn. 06457

V. PROFESSIONAL STAFF: R. A. Rosenbaum, Director; Harry Sitomer, Administrative Assistant

VI. PROJECT SUPPORT:
A. Organizational sponsorship: Wesleyan University
B. Funding agency: National Science Foundation

VII. SPECIFIC PURPOSES AND OBJECTIVES: To write a high school geometry course with the following characteristics:
1. Five axioms which yield basic properties of coordinate systems on a line and on a plane;
2. An introduction, via the affine plane;
3. A transition to Euclidean plane;
4. Reliance on functions (affinities, similitudes, isometries, translations, symmetries) to develop properties of geometric figures.

VIII. SPECIFIC SUBJECTS AND GRADE LEVEL: Plane Geometry - tenth year (Some schools have used it in the ninth year for honor classes and others for the eleventh year after two years of algebra.)

IX. MATERIALS ALREADY PRODUCED AND DESCRIPTION:
1. Modern Coordinate Geometry - Students' text Preliminary Edition, Parts I and II
2. Modern Coordinate Geometry - Commentary for Teachers - Preliminary Edition, Parts I and II
3. Modern Coordinate Geometry - Students' Text Revised Edition, Parts I and II
4. Modern Coordinate Geometry - Commentary for Teachers - Revised Edition, Parts I and II

X. USE OF PROJECT MATERIALS: Thirty-one teachers used the complete program during 1964-65, and 20 teachers will have used the program during the 1965-66 academic year. Schools where the materials are used:

Vailsburg High School, Newark, N. J.; Valley Stream North High School, Franklin Square, N. Y.; Nazareth Academy, Rochester, N. Y., and Mt. Hermon School, Mt. Hermon, Mass.

XI. LANGUAGE IN WHICH MATERIALS WERE WRITTEN: English

XII. LANGUAGES INTO WHICH MATERIALS HAVE BEEN OR WILL BE PRINTED IN TRANSLATION: None

XIII. ADDITIONAL MATERIALS PRESENTLY BEING DEVELOPED: None

XIV. MATERIALS AVAILABLE FREE: 3 and 4. Request from R. A. Rosenbaum.

XV. MATERIALS PURCHASABLE: No arrangements as yet.

XVI. SPECIFIC PLANS FOR EVALUATION OF MATERIALS: The 31 teachers mentioned in item X submitted chapter reports containing subjective evaluations and making constructive suggestions. Of the other 20 teachers in item X, 10 are submitting reports of experiences with the revised edition. The 31 teachers met about every three weeks with a mathematician consultant to discuss and evaluate.

XVII. SPECIFIC PLANS FOR TEACHER PREPARATION: None

XVIII. PROJECT ACTIVITIES SINCE MARCH 1965 REPORT: None listed

XIX. PLANS FOR THE FUTURE: None described.

SYNOPSES

The following brief descriptions concern projects which are in initial stages of development, or are examples of work being done by local and regional groups. They are included to give readers an appreciation of the variety of approaches being taken in curriculum development and a preview of new work as it begins.

I. PROJECT TITLE: A Longitudinal Study of the Effectiveness of Children's Experimentation and Learning of Selected Physics Principles
ORIGINATOR: Arnold M. Lahti, Western Washington State College, Bellingham, Wash.
FUNDING AGENCY: U. S. Office of Education
DESCRIPTION: Children in grades 1-6 are designing their own experiments, conducting the experiments, and drawing conclusions from them on an individual basis. This programmed set of experiences based on physics topics (i.e., arbitrary units of volume, density, Archimedes Principles, surface tension) is being used by fifteen teachers, and being evaluated by a testing program for sixth graders. No materials are available at the present time.

II. PROJECT TITLE: A First Step Towards the Implementation of the Cambridge Mathematics Curriculum in a K-12 Ungraded School
ORIGINATORS: Garrett R. Foster, Burt A. Kaufman, Nova High School, 3600 S.W. 70th Avenue, Fort Lauderdale, Fla.
FUNDING AGENCIES: Florida State Department of Education; U. S. Office of Education
DESCRIPTION: This project is designed to develop a long range plan to create a K-12 mathematics program based on the goals of the Cambridge Conference Report, and comprehensive supplementary programs for teacher training and research. A final report is available upon request to the above address.

III. PROJECT TITLE: Radioisotopes and Inquiry
ORIGINATOR: J. L. Rips, Vice President Bio-Atomic Research Foundation, 12020 Chandler Blvd., North Hollywood, Calif.

FUNDING AGENCY: U. S. Atomic Energy Commission
DESCRIPTION: This project will prepare, and evaluate by field trial, selected experiments using radioisotopes as an investigative tool in biology classes, grades 10-12. Field trials and editorial revisions of the student manual and teachers' commentary are scheduled for June-July, 1966. No materials presently available.

IV. PROJECT TITLE: Conceptually Oriented Program in Elementary Science
ORIGINATORS: Morris H. Shamos and J. Darrell Barnard, Washington Square College, New York University
FUNDING AGENCY: U. S. Office of Education
DESCRIPTION: A pilot project to develop an elementary science sequence (K-6) related to the conceptual system represented by the conservation of energy. A testing program is being planned. No materials are presently available.

V. PROJECT TITLE: Elementary School Science Planning Project
ORIGINATOR: Leonard Rieser, Norwich School, Norwich, Vt. 05055
FUNDING AGENCY: U. S. Office of Education
DESCRIPTION: In cooperation with Dartmouth College, plans are being made to teach and test the effectiveness of a composite of new materials for elementary science drawn from AAAS, ESS, SCIS and other such national programs. This project is designed to be a model usable by other small school districts for achieving effective introduction of new science materials. The materials and evaluating procedures will be prepared during the 1966-67 school year. In-service education for teachers is to begin in August, 1966.

VI. PROJECT TITLE: Secondary School Mathematics Curriculum Improvement Study
ORIGINATOR: Howard F. Fehr, Teachers College, Columbia University, N. Y. C.
FUNDING AGENCIES: U. S. Office of Education; Teachers College, Columbia University
DESCRIPTION: The purpose of this project is to "create a unified global program of mathematics instruction" for grades 7-12. Work is just beginning and no materials are available.

VII. PROJECT TITLE: Sociological Resources for Secondary Schools
ORIGINATOR: American Sociological Association, Robert A. Feldmesser, Director. Dartmouth College, Hanover, N. H. 03755 After Sept. 1, 1966, the director will be Robert C. Angell, University of Michigan, Ann Arbor, Mich.
FUNDING AGENCY: National Science Foundation
DESCRIPTION: An effort is being made in this project to develop sociology materials suitable for secondary school courses in history, government, civics, problems of democracy, sociology and psychology. A planning and writing conference will be held in the summer of 1966, and the resulting materials will be tested in the author's classrooms. Evaluation instruments are being devised by ETS for later use in selected schools. Published materials should be available sometime in 1967.

VIII. PROJECT TITLE: Geology Resource Unit
ORIGINATOR: Baltimore City Public Schools, Elra M. Palmer, Supervisor of Science, 2521 North Charles Street, Baltimore, Md. 21218
FUNDING AGENCY: NDEA funds through Maryland State Department of Education
DESCRIPTION: An accurate, succinct syllabus on geology is being planned for use by teachers in a seventh grade science course. The tryout of these materials during 1965-66 will result in feedback reports to be used for later revisions. The teacher's guide may be purchased for $1.50 (10% discount on quantity orders) from the Bureau of Publications, Baltimore City Schools, 3 East 25th Street, Baltimore, Md. 21218

IX. PROJECT TITLE: A Creative Laboratory Science Program for Junior High Schools
ORIGINATOR: Elinor Widrow Semel, Pocantico Hills Central School, Bedford Road, Tarrytown, N. Y. 10591
FUNDING AGENCY: Funds are being sought
DESCRIPTION: Creative Labs is designed to provide a stimulating opportunity for students to perform and analyze programmed experiments which integrate the different sciences. There are planned "creative periods" to encourage students to design experiments

to answer their own questions. An evaluation program is being planned. No materials are presently available.

X. PROJECT TITLE: Massachusetts Department of Education - NASA Curriculum Resource Guide
ORIGINATOR: Owen B. Kiernan; Director: John W.Packard
FUNDING AGENCY: National Aeronautics and Space Administration (NASA)
DESCRIPTION: This K-12 resource guide is designed to help teachers utilize developments of the national space program to provide enrichment material for science classes. It will be published in late 1966, and can then be obtained from the U. S. Government Printing Office.

XI. PROJECT TITLE: Experimental Project in General Mathematics
ORIGINATOR: Wilson Goodwin, Des Moines Public Schools, 1800 Grand St., Des Moines, Iowa
FUNDING AGENCIES: Title I, E.S.E.A.; Des Moines Schools
DESCRIPTION: The objective of this project is to increase the interest and competency of low achievers in mathematics at the ninth grade level. Experimental materials, involving student use of a computer, have been developed and are available from the Central University of Iowa, Pella, Iowa. About 150 teachers are using the program experimentally. A 15-minute movie about the project will be available from the Des Moines Schools. Use of the materials will be expanded into other schools.

XII. PROJECT TITLE: Evaluation of Secondary Mathematics Curricula
ORIGINATORS: Paul C. Rosenbloom; Director: James J. Ryan, Minnesota National Laboratory, 235 N - Griggs, Midway Building, St. Paul, Minn. 55104
FUNDING AGENCY: National Science Foundation
DESCRIPTION: This is an attempt to assess pupil achievement in mathematics, in an effort to, in turn, assess the efficiency of experimental programs in secondary mathematics. (SMSG, Ball State Program, UICSM, UMMaP). Technical reports of the effects of the materials will be issued by October of 1967.

XIII. PROJECT TITLE: Elementary Science Curriculum
ORIGINATOR: Board of Education, St. Mary's County, Md. Director: Edward V. Siemasko, Felix Johnson Educational Center, 20 Tulagi Place, Lexington Park, Md. 20653
FUNDING AGENCIES: Maryland State Department of Education; St. Mary's County and Charles County Boards of Education
DESCRIPTION: This project is a sequential curriculum development which places major emphasis on building conceptual understandings. Three curriculum guides (I - grades 1-2; II - grades 3-4; and III - grades 5-6) are available at $2.00 each, from the above address. A junior high school guide is being developed.

XIV. PROJECT TITLE: Effects of Modern and Conventional Mathematics Curricula on Pupil Attitudes, Interests, and Perception of Proficiency
ORIGINATOR: James J. Ryan, Minnesota National Laboratory, 235 N - Griggs, Midway Building, St. Paul, Minn. 55104
FUNDING AGENCY: U. S. Office of Education
DESCRIPTION: The purpose of the project is to determine the differential effects of recently developed experimental programs in secondary mathematics (SMSG, Ball State, and UICSM) upon the attitudes and interests of ninth grade pupils in mathematics. Technical reports of the results of this study will be completed by May of 1967.

II. The College Commissions of the United States

TITLE OF COMMISSION: Advisory Council on College Chemistry (ACCC)

CHAIRMAN: L. Carroll King
Address: Department of Chemistry, Northwestern University,
Evanston, Ill.

EXECUTIVE SECRETARY: William B. Cook
Address: Department of Chemistry, Stanford University,
Stanford, Calif. 94305

SPONSORING AGENCY: None

SOURCE OF FINANCIAL SUPPORT: National Science Foundation

OBJECTIVES OF COMMISSION: The Council collects and disseminates information on effective ways of improving teaching in colleges and universities. It hopes to provide the leadership and stimulus for a number of projects throughout the chemical education community which will result in imaginative, up-to-date curricula, more effective tools for learning, improved textual material, innovations in the experimental aspects of chemistry instruction, increased emphasis on training college chemistry teachers and stimulating interdisciplinary programs for non-science majors. In essence, the Council will serve as a nerve center for curricular activity in universities and colleges including two-year colleges.

PROJECTS UNDERWAY: Most programs of the Council are conducted under the aegis of the standing committees listed below.

I. General Chemistry Committee - A report of a conference on the use of "lecture experiments" will be published during the summer of 1966. A collection of "lecture experiments" is underway. A report of a conference on alternatives and supplements to the introductory chemistry laboratory will be published during 1966. A continuing study of the content of freshman chemistry is underway.

II. Curriculum and Advanced Courses Committee - This committee was responsible for a conference on articulation problems of two-year and four-year colleges. A report will be published during 1966. A standing committee on Junior Colleges was established in the Council.

III. Junior College Committee - This committee was established in April, 1966. The first project is to establish liaison with other commissions on two-year and four-year college articulation problems.

IV. Editorial Committee - Publishes an occasional newsletter, edits and publishes reports of conferences sponsored by the Council, and is responsible for publishing other official council documents. See list of publications. All publications are distributed free to chemistry teachers or other interested individuals who request that their name be placed on the list.

V. Resource Papers Committee - Commissions and oversees publication of three to four Resource Papers each year. These papers are initially published in the *Journal of Chemical Education*, reprinted and distributed to the Council mailing list.

VI. Committee on Science for Non-Science Majors - Cooperation with the Commission on Undergraduate Education in the Biological Sciences has resulted in plans for commercial publication of a series of paperback references at the elementary level on important concepts at the biology-chemistry interface. A report of a conference on chemistry courses for non-science specialists will be published during 1966.

VII. Teacher Development Committee - A report on the use of junior staff in chemistry instruction will be published during 1966. A proposal for Federal program of support of education and research in chemistry has been prepared.

VIII. Teaching Aids Committee - A conference was held during March of 1966 to gather information on innovative uses of teaching aids in chemistry instruction. A "state-of-the-art" document will be published during 1966. A Guidelines and Recommended Titles Lists for Undergraduate Chemistry Libraries was recently published.

Other activities include: A continuous study gathering information to document the role of liberal arts colleges in the training and education of chemists; interdisciplinary cooperation to implement curriculum projects in the physical sciences at the elementary and secondary level; interdisciplinary cooperation to encourage establishment of regional science centers; and intercommission cooperation to study training of instructional personnel other than by conventional doctoral or masters degrees.

PLANS FOR THE FUTURE:

I. Major conferences designed to result in published reports will be held during 1966 bearing on these topics. Structure as the elementary chemistry course; new approaches to chemistry courses for non-science specialists;

the role of liberal arts colleges in training and educating chemists; and novel equipment and novel ideas to assist instruction in chemistry.

II. A series of conferences will be held regionally to acquaint academic chemists with recent developments in chemistry curricula and innovations in chemistry instruction, including the use of teaching aids.

III. Major projects to be initiated, include: A research project to study the purpose, usefulness and alternatives to the laboratory program in first year college chemistry; a project to demonstrate the usefulness of film loops in chemistry instruction; a project to evaluate and demonstrate the usefulness of video-tape equipment in chemistry instruction; a project to evaluate the potential of computer generated films for teaching certain concepts in advanced chemistry courses; and a project to produce a novel "self-learning" program to combat technical obsolescence among college teachers.

IV. Studies to be undertaken which may result in Council projects, include: a comprehensive topical analysis of the content of modern chemistry curricula; a study of "splinter" curricula, i.e., those topics that draw equally on two or more classical disciplines in the sciences; a study of "overlap" in chemistry curricula; an incisive investigation of the role of the laboratory (in advanced chemistry courses) in the training and education of chemists; mathematical preparation for the undergraduate training of chemists; and library needs for training chemists at the two-year college level.

PUBLICATIONS AVAILABLE: Free upon request to Director - (single copies only).

1. Newsletter No. 1, June 1963. 4 pages
2. Newsletter No. 2, August 1964. 4 pages
3. Report. "Instruction in General Chemistry and the Expanding Student Population." September 1964. 12 pages
4. Report. "Experimental Curricula in Chemistry." September 1964. 57 pages
5. Resource Paper I - "Ligand Field Theory," by F. A. Cotton, reprinted from September 1964 Journal of Chemical Education. 11 pages
6. Report. "The Content of Introductory College Chemistry." January 1965. 22 pages
7. "Thermochemical Investigations for a First-Year College Chemistry Course," by Neidig, Schneider and Teates, reprinted from the January 1965 Journal of Chemical Education.

6 pages.

8. Resource Paper II - "Elementary Chemical Thermodynamics," by L. K. Nash, reprinted from February 1965 Journal of Chemical Education. 12 pages

9. Newsletter No. 3, November 1965. 2 pages

10. Resource Paper III - "Bond Energies," by S. W. Benson, reprinted from September 1965 Journal of Chemical Education. 19 pages

11. "Modern Experiments for Introductory College Chemistry," reprinted from September 1965 Journal of Chemical Education. 34 pages

12. Library List, April 1966. 44 pages

13. Newsletter No. 4, April 1966. 4 pages

14. Resource Paper IV - "Isoelectric Principle," by H. A. Bent, reprinted from April 1966 Journal of Chemical Education. 18 pages

TITLE OF COMMISSION: Commission on College Geography (CCG)

CHAIRMAN: Saul B. Cohen
Address: Clark University, Worcester, Mass. 01610

DIRECTOR: John F. Lounsbury
Address: Eastern Michigan University, Ypsilanti, Mich. 48197

SPONSORING AGENCY: Association of American Geographers

Address: 1146 16th St., N.W., Washington, D. C. 20036

SOURCE OF FINANCIAL SUPPORT: National Science Foundation

OBJECTIVES OF COMMISSION: Improvement of geography courses and programs at the college level.

PROJECTS UNDERWAY: Development of Course Outlines; development of Bibliographic Materials; and development of Summer Institutes for College Teachers.

PLANS FOR THE FUTURE: Development of major and minor and graduate programs; development of course materials; development of special bibliographic materials; and development of programs to improve teacher competence.

PUBLICATIONS AVAILABLE: Free upon request to the Director:
1. Geography in Undergraduate Liberal Education
2. A Basic Geographical Library

TITLE OF COMMISSION: Commission on College Physics (CCP)

CHAIRMAN: Matthew Sands
Address: SLAC, Stanford University, Stanford, Calif.

DIRECTOR: John M. Fowler
Address: CCP, 611 Physics-Astronomy Building,
Ann Arbor, Mich. 48104

SPONSORING AGENCY: American Association of Physics Teachers
Address: 345 East 45 Street, New York, N. Y. 10017

SOURCE OF FINANCIAL SUPPORT: National Science Foundation

OBJECTIVES OF COMMISSION: ". . . the Commission considers its primary functions to be the collection and dissemination of information about curricular developments, the critical appraisal of the effectiveness of these developments, the consideration of what additional efforts are needed, and the stimulation of responsible groups of physicists toward course and curriculum development. Actual operations, such as the development, production, and distribution of new written materials, apparatus, films, etc. are, of course, the ultimate objectives, but the Commission engages directly in these activities only when it finds urgent needs that are not being met by existing institutions and which do not appear likely to be satisfied by anything less than a national effort for which no present agency exists. . . ." (*Am. J. Phys.*, 30, 665, 1962).

PROJECTS UNDERWAY: Teaching materials which are being developed with CCP encouragement and assistance are computer programs, both tutorial and computational, computer-animated films, an animated film on symmetry, monographs, the *Resource Letters*, and the Momentum Books series. CCP Panels are studying the major curricula and the preparation of high school teachers.

PLANS FOR THE FUTURE: The CCP expects to produce resource booklets or packets on topics which are self-contained but useful as examples in the typical introductory course. It will also provide resource booklets on labs and films. A major goal is the application of a "design analysis" approach, including as participants designers, writers, etc. to the elementary ideas of physics. Materials development, course and curriculum studies will continue.

PUBLICATIONS AVAILABLE: Free upon request to the Director:

1. Newsletter #5 - March 1964
2. Physical Sciences Research Papers, Nos. 42, 34, 50, 54, 58
3. The First Ann Arbor Conference on Curricula for Undergraduate Majors in Physics - Report
4. The Second Ann Arbor Conference Report
5. CCP Progress Report - June 1960-May 1962
6. CCP Newsletters #6 - #9
7. Report of Conference on Interdisciplinary Activities, Seattle, June 28-July 2, 1965
8. Report of Proceedings of the Boulder Conference on Physics for Nonscience Majors, Boulder, Colo., July 20-29, 1964
9. CCP Progress Report, June 1964 (Biennial)

Reports being published:

June, 1966: Instruction by Design. Report of Working Conference on New Instructional Materials. Seattle, Wash. 6/21/65-8/20/65

The Computer in Physics Instruction. Report of Conference on Uses of the Computer in Undergraduate Physics Instruction, Irvine, Calif. November 4-6, 1965

Newsletter #10

September, 1966: American Jour. Physics, CCP Progress Report, June, 1966

TITLE OF COMMISSION: Commission on Education in Agriculture and Natural Resources (CEANAR); formerly Committee on Educational Policy in Agriculture (CEPA)

CHAIRMAN: R. E. Larson
Address: Dean, College of Agriculture, Pennsylvania State University, University Park, Pa. 16802

EXECUTIVE SECRETARY: R. E. Geyer
Address: Commission on Education in Agriculture and Natural Resources, 2101 Constitution Avenue, Washington, D. C. 20418

SPONSORING AGENCY: National Academy of Sciences-National Research Council
Address: 2101 Constitution Avenue, Washington, D. C. 20418

SOURCE OF FINANCIAL SUPPORT: National Science Foundation

OBJECTIVES OF COMMISSION: To continue to review trends in education for undergraduates in agriculture and natural resources; to stimulate discussion, re-evaluation and improvement; and to prepare recommendations for the development of academic programs in the future; to stimulate and assist in the development of the agricultural and natural resource aspects of general education.

PROJECTS UNDERWAY: A program, co-sponsored with the Commission on Undergraduate Education in the Biological Sciences (CUEBS) to develop recommendations for desirable preparation in the biological sciences for undergraduates in agriculture, including agricultural engineering and natural resources, and to propose mechanisms for achieving this kind of preparation.

Conference on Undergraduate Teaching in the Animal Sciences, involving 20 animal scientists and several observers, May 20-21, 1966.

Conferences on undergraduate education in agricultural economics and phytopathology in August 1966, and agronomy in November 1967, will be co-sponsored with the appropriate societies. These conferences are a continuation of a program begun with conferences in dairy science and horticultural science held in August 1965.

Panel visits to five colleges during Spring 1966 to (1) inform the Commission about the status of, and trends in, undergraduate education in agriculture and natural resources, and (2) assist the host institution in self-evaluation.

Panel on Natural Resource Science, formed to be concerned with desirable changes in the education of scientists, resource managers and other professional personnel who will be involved in the use and management of natural resources. The Panel is developing model curricula for undergraduates preparing to be resource scientists and managers.

An informal study of the extent to which students other than those majoring in agriculture and natural resources are exposed to concepts in agriculture and natural resources that should be a part of their general education.

PLANS FOR THE FUTURE: Study of physical sciences and mathematics needs for students in agriculture and natural resources; conferences on course and curriculum content in several areas of agriculture and natural resources; program to stimulate and assist in development of agricultural and natural resources in general education; study of two-year institutions; conference on the role of scientific and professional societies in undergraduate education; and conferences on undergraduate teaching co-sponsored with several individual societies in agriculture and natural resources.

PUBLICATIONS AVAILABLE: Copies are available free unless otherwise indicated.

1. Brochure "Threads of Life," 1964, describes careers in agricultural science, with emphasis on biological science aspects of agriculture. Copies may be obtained only from colleges, schools, and departments of agriculture in institutions of higher education, and not from the Committee on Educational Policy in Agriculture. A list of these colleges, schools, and departments is available from the Commission office.
2. "The Agricultural Sciences," statement on the nature and challenges of the agricultural sciences, reprint from *Bioscience*, Vol. 15, No. 5, May, 1965, p. 349.
3. "Farm-Nonfarm Origin and Some Effects on Students in Colleges of Agriculture," Committee on Educational Policy in Agriculture, Mimeo Series Publication #1, January, 1964.
4. "Report of A Seminar on Opportunities in Business for B.S. Graduates of Colleges of Agriculture," Committee on Educational Policy in Agriculture, Mimeo Series Publication #3, June, 1964.
5. "A Survey of Placement, Agriculture and Forestry, July, 1963 to June, 1964," Committee on Educational Policy in Agriculture, Mimeo Series Publication #4, October, 1964.

6. "Minimum Requirements for Bachelor of Science in Agriculture, including Agricultural Sciences, Agricultural Production, and Agricultural Business," December, 1961.
7. Papers: "Trends and Issues in Education in the Agricultural Sciences," by A. E. Darlow, for presentation to the Resident Teaching Subdivision, Agronomic Education Division, American Society of Agronomy, annual meeting. November 18, 1964.
8. "Poultry Science in General Education--and in Recruiting," by Richard E. Geyer, presented to the Poultry Section of the Association of Southern Agricultural Workers, February 2, 1965.
9. "Educational Objectives in the Agricultural Sciences," by George A. Gries, presented at a Symposium on Education in Dairy Science sponsored by Education Section, American Dairy Science Association, June 23, 1964.
10. "The Ferment in Undergraduate Biology--Does it Make Any Difference?" by Richard E. Geyer, presented to the Western Region Meeting of Deans and Directors of Resident Instruction, University of Hawaii, March 11, 1965.
11. "Trends and Issues in Undergraduate Education in The Agricultural Sciences," by Richard E. Geyer, presented at the Southern Regional Meeting of the Deans and Directors of Resident Instruction, Colleges of Agriculture, New Orleans, Louisiana, April 9, 1965.
12. "Activities of the Committee on Educational Policy in Agriculture," by Richard E. Geyer, presented at the Meeting of the National Association of Colleges and Teachers of Agriculture, Wilmington College, April 27, 1965.
13. "Excellence in the Education of Future Agricultural Communicators," by Richard E. Geyer, presented during the annual meeting of the American Association of Agricultural College Editors, Rutgers University, July 8, 1965.
14. "Activities of the Commission on Education in Agriculture and Natural Resources," by A. E. Darlow, presented to the Resident Instruction Section, Division of Agriculture, National Association of State Universities and Land-Grant Colleges, Minneapolis, Minnesota, November 15, 1965.
15. "Feed Manufacturers of the Future," based on a pilot study by the Committee on Educational policy in Agriculture, reprint from Feed Age, Vol. 15, No. 10, October, 1965, p.22.
16. "Trends and Issues in Education in the Agricultural Sciences," reprint from Bioscience, Vol. 15, No. 11, Nov., 1965, p. 711.
17. "Training for Applied Biology," by Richard E. Geyer,

presented to the 1965 Summer Institute for Teachers of Introductory Biology at the College Level, Williams College, Williamstown, Massachusetts, July 30, 1965.

18. "Report of Visiting Panel Program - Spring, 1964," dated July, 1965.

TITLE OF COMMISSION: Commission on Engineering Education (CEE)

CHAIRMAN: John R. Whinnery
Address: Department of Electrical Engineering, University of California, Berkeley, Calif.

EXECUTIVE DIRECTOR: Newman A. Hall
Address: Commission on Engineering Education, 1501 New Hampshire Ave., N. W., Washington, D. C. 20036

SPONSORING AGENCY: None described.

SOURCES OF FINANCIAL SUPPORT: Several foundations, including National Science Foundation, Alfred P. Sloan Foundation, and Charles F. Kettering Foundation.

OBJECTIVES OF COMMISSION: To provide an objective, independent, positive influence on the quality and performance of engineering educational programs.

PROJECTS UNDERWAY: Build: Bi-University Institutional Liaison for Development; ECCP: Engineering Concepts Curriculum Project; Engineering Film Catalog; Study on Laboratory Instruction for Engineering; Case Studies for Engineering Education; Faculty Development in the Use of Computers in Engineering Education.

PLANS FOR THE FUTURE: Continuation of the above programs, in addition to an expanded Design Laboratory Workshop Program for faculty and their students, based on the completed 1965 program.

PUBLICATIONS AVAILABLE: Publications are available at no cost by writing to the offices of the Commission.
1. Third Annual Report
2. Proceedings: Third Conference on Engineering Design Education
3. Newsletters on Engineering Concepts Curriculum Project
4. Film Catalog
5. Computer Report No. 1, by Baumann, Fenves and Schmit
6. Proceedings: Conference on the Impact of the Computer on Education in Engineering Design (available summer, 1966)

TITLE OF COMMISSION: Commission on Undergraduate Education in the Biological Sciences (CUEBS)

CHAIRMAN: Earl D. Hanson
Address: Shanklin Laboratory of Biology, Wesleyan University, Middletown, Conn. 06457

DIRECTOR: Martin W. Schein
Address: George Washington University, 1750 Pennsylvania Ave., N. W., Suite 304, Washington, D. C. 20006

SPONSORING AGENCY: American Institute of Biological Sciences
Address: 3900 Wisconsin Ave., N. W., Washington, D. C.

SOURCE OF FINANCIAL SUPPORT: National Science Foundation

OBJECTIVES OF COMMISSION: Improvement of undergraduate education in the biological sciences by reducing the gap between the research findings and what is taught in classroom, laboratory and field; by identifying and/or developing improved instructional materials, techniques and procedures; by identifying restructured, modernized, and innovative biology curricula and describing these in CUEBS NEWS and other publications; by assisting and aiding in an enzymatic way, biologists in institutions where curriculum development and improvement is about ready to occur; by the preparing of position papers and/or recommendations for improved programs for the preparation of instructional personnel in the secondary school, two-year and four-year colleges; by encouraging colleges to develop experimental curricula, teacher preparation programs, biology teaching facilities, and student-centered and laboratory investigations; by participation of the CUEBS executive staff, in state biology curriculum conferences and by describing CUEBS activities before meetings of professional societies; by developing, producing and trying out biology materials--laboratory investigations, syllabi, learning packets, guides to construction of facilities, biology methods programs, paperback volumes on the interfaces of biology with other sciences; and by describing the content of a two-year core of biological knowledge for all majors, covering: molecular, cellular, organismic, genetical, evolutionary, developmental, behavioral, and environmental aspects of biology.

PROJECTS UNDERWAY: Analysis of the content of core biology programs in five institutions that have recently implemented a restructured curriculum; formation of a statement on philosophy, rationale and content of biology for non-majors; try out of BSCS Laboratory Blocks to determine the feasibility of adaptation and to check on the acceptance of the laboratory block concept in college biology; production of a booklet of biology test items as paradigms for biology instructors preparing questions to evaluate learning of biology content areas, biology at various levels of organization, and behavioral patterns of the student; development of a Biology Methods Program for prospective secondary school teachers; gathering, collating, and interpreting data obtained from professional schools in the medical sciences, identifying the biological information expected during undergraduate preparation; preparation of a position paper describing the undergraduate education in biology desirable for students in pre-professional programs in the agricultural sciences; study of education in biology in the two-year colleges, with special emphasis on Core biology, instructional personnel and intercalation of two-year with four-year college biology programs; development of materials useful to biologists in planning the construction of biological teaching and research facilities; and cooperation with other college commissions in the production of monograph series on the interfaces of biology and chemistry; studying undergraduate education in the sciences in the developing two-year colleges, recommending programs to improve the pre-service and in-service preparation of high school teachers and two-year and four-year college instructors.

PLANS FOR THE FUTURE: Cooperation with BSCS in the development, evaluation, and publication of materials for a Biology Methods Program; development of an evaluation instrument for the core of biological knowledge recommended as common for all biology majors (BioScience 14(8):25-29, August, 1964); cooperation with other college science commissions in the planning and production of paperback monographic series on the interfaces of biology with physics, with mathematics, with engineering, and other cognate bodies of knowledge; development, evaluation, and publication of learning packets, in the following areas of biological knowledge: molecular, cellular, organismal, developmental, genetical, evolutionary, environmental, and behavioral; encouragement of the establishment of science materials and information retrieval centers; stimulation of the development of experimental secondary school teacher preparation programs, and of Ph.D. programs to better prepare college instructional personnel; initiation of the production of materials (e.g. monographs, audio-tutorial systems, etc.) to support the teaching of the core of biological knowledge identified as being desirable for all biology majors (BioScience 14(8):25-29, August, 1964); and encouragement of biologists in colleges and universities (e.g. through state and regional conferences and consultant services) to study thoroughly the content of the courses and the curriculum in biology with the intent of identifying the ideas of biology which are important to understand and developing ways in which students should experience the learning of biology.

PUBLICATIONS AVAILABLE: Free upon request to the Director.
1. CUEBS NEWS (newsletter published bi-monthly)
2. New Directions in Biology Teaching. Thomas S. Hall (BioScience 14(4):31-33; April, 1964)
3. Core Studies for Undergraduate Majors: A Report on the CUEBS Berkeley and St. Louis Conferences (BioScience 14(8): 25-29; August, 1964)
4. Report of the Western Regional Conference on Courses and Curricula in the Biological Sciences
5. The Consultants Bureau, 1964-65
6. Report of the Midwestern Regional Conference on Courses and Curricula in the Biological Sciences
7. Report of the Northeastern Regional Conference on Courses and Curricula in the Biological Sciences
8. Report of the Southeastern Regional Conference on Courses and Curricula in the Biological Sciences
9. Preparing the Modern Biology Teacher: A Position Paper of the Panel on Preparation of Biology Teachers. Benson E. Ginsburg, Chairman. (BioScience, December, 1965)
10. CUEBS and the Preparation of Biology Teachers. Ted F. Andrews. (NABT News and Views IX (4); August, 1965)

TITLE OF COMMISSION: Committee on the Undergraduate Program in Mathematics (CUPM)

CHAIRMAN: Richard D. Anderson
Address: Department of Mathematics, Louisiana State University, Baton Rouge, La.

DIRECTOR: Lincoln K. Durst
Address: P. O. Box 1024, Berkeley, Calif. 94701

SPONSORING AGENCY: Mathematical Association of America
Address: State University of New York at Buffalo, Buffalo, N. Y.

SOURCE OF FINANCIAL SUPPORT: National Science Foundation

OBJECTIVES OF COMMISSION: The study and improvement of college mathematics and mathematics instruction.

PROJECTS UNDERWAY: CUPM maintains Panels on (1) Teacher Training, (2) Physical Sciences and Engineering, (3) Biological, Management and Social Sciences, (4) Pregraduate Training. These Panels study their respective areas and report to the Commission. We also maintain a Consultants Bureau whose members visit individual institutions to give advice and obtain information. Our Advisory Group on Communications handles publication policy; the Group has prepared a Basic Library List for undergraduate colleges. We have recently established a Panel on College Teacher Preparation.

PLANS FOR THE FUTURE: The above activities will continue. We are adding a Panel on the Two-Year College, and a Panel on Statistics. An ad hoc Subcommittee on Applied Mathematics will prepare a report.

PUBLICATIONS AVAILABLE: Free upon request to the director. Requests for multiple copies should be accompanied by a description of the proposed use.

1. Report No. 1--Five Conferences on the Training of Mathematics Teachers
2. Report No. 3--The Production of Mathematics Ph.D.'s in the United States - Revised
3. Report No. 8--Annual Report, August 1962-August 1963
4. Report No. 9--Ten Conferences on the Training of Teachers of Elementary School Mathematics, 1963
5. Report No. 10--Annual Report, August 1963-August 1964
6. Report No. 11--Ten Conferences on the Training of Teachers of Elementary School Mathematics, 1964

7. Report No. 12--Annual Report, August 1964-August 1965
8. A General Curriculum in Mathematics for Colleges
9. Recommendations for the Training of Teachers of Mathematics (A Summary)
10. Course Guides for the Training of Teachers of Junior High and High School Mathematics
11. Course Guides for the Training of Teachers of Elementary School Mathematics (Preliminary Report)
12. Recommendations on the Undergraduate Mathematics Program for Engineers and Physicists
13. Recommendations on the Undergraduate Mathematics Program for Work in Computing
14. Pregraduate Preparation of Research Mathematicians
15. Tentative Recommendations for the Undergraduate Mathematics Program for Students in the Biological, Management, and Social Sciences
16. Mathematics Text Materials for the Undergraduate Preparation of Elementary School Teachers
17. CUPM Basic Library List
18. Teacher Training Supplement to the Basic Library List

TITLE OF COMMISSION: Council on Education in the Geological Sciences (CEGS)

CHAIRMAN: None

DIRECTOR: John Harbaugh
Address: Geology Dept., Stanford University, Palo Alto, Calif.

SPONSORING AGENCY: American Geological Institute
Address: 1444 N Street, N. W., Washington, D.C. 20005

SOURCE OF FINANCIAL SUPPORT: National Science Foundation

OBJECTIVES OF COMMISSION: The objectives of CEGS are to maintain continuous inquiry into the state of geological education at the college and university level and to provide detailed recommendations and guidelines in problem areas. It encourages and assists development of appropriate new educational materials and activities. It reviews and evaluates current projected programs in geological education and provides for communication and essential consultation on educational improvement in the geological sciences.

PROJECTS UNDERWAY: Studies of sequence and content of courses leading to a major in geology; studies of the relationship of geology to liberal arts education; problems of interdisciplinary cooperation; problems of secondary school earth science teacher preparation; and study and implementation of methods of faculty improvement.

Specific projects currently underway: Development of recommendations for geology curricula; design of an advisory program to aid colleges and universities in curriculum review and modification; testing of four experimental introductory courses in geology, widely varied in content and approach; development of mathematics curricula for geology majors; preparation of an annotated bibliography on the application of mathematics to geology; development of physics curricula for geology majors; generation of "rescue" training programs for secondary school teachers of earth science; design of college curricula for the preparation of secondary school teachers of earth sciences; generation of experimental institutes and conferences for secondary school teachers of earth science; preparation of an annotated bibliography of paperbound books of interest to teachers and students of geology; enlistment of directors for summer institutes in areas of critical need for continuing education of college faculty; exploration of possibilities of expanded faculty exchange programs; generation of exploratory conferences to examine new areas of geological interest; development of mechanisms for educational-industrial exchanges for faculty professional development; generation of short papers on geological topics of current interest; and development of methods to increase the number and availability of faculty fellowships.

PLANS FOR THE FUTURE: To complete the current projects and to initiate others now in the discussion stage.

PUBLICATIONS AVAILABLE:

1. "Evaluation as a Geologic Concept: An Introductory Geology Course," by Leo F. Laporte, Brown University, obtainable as reprint from the Journal of Geological Education, Vol. XIII, No. 4, Oct. 1965
2. "Earth Science Teacher Preparation: Statistics and Recommendations," reprint from Journal of Geological Education, Vol. XIV, No. 1, Feb. 1966
3. "Mathematics Recommendations for Undergraduate Geology Students," reprint from the Journal of Geological Education, Vol. XIII, No. 3, 1965
4. "Introductory Geology in the Framework of Liberal Arts Studies," reprint from the Journal of Geological Education, Vol. XIII, No. 5, Dec. 1965
5. "Courses in Geology for Advanced Non-Majors," reprint from the Journal of Geological Education, Vol. XIII, No. 5, Dec. 1965.

III. Science and Mathematics Materials Received from U. S. State and Local Systems

Science and Mathematics Materials Received from State and Local Systems

The following materials have been received and are on file in the International Clearinghouse at the University of Maryland. While the list is believed to be comprehensive, it should not be inferred that it is a complete list of all state and local publications. Many of the titles are available free or at cost from the state or local systems, but at least some are in limited supply or out of print.

This list has been up-dated for our American readers, but has been included especially for our international friends so that they may gain some appreciation of regional curriculum activities. Henceforth, only newly published titles received from state or local units shall be included in the International Clearinghouse Report.

ALABAMA - State Department of Education, Montgomery, Ala. State - Biological Principles, 1962; Is Pupil Participation in Science Vigorous or Vague, Interesting or Incidental, Tempting or Tedious, Active or Absent, Lively or Lazy in Junior High School? 1961; Planning Science, Elementary Schools, 1962; Science Laboratories for Learning, 1960; Science Learning, Elementary Schools, 1961; Suggested Activities for Use in Elementary Science, 1960; Alabama Course of Study, Grades 7-12, 1964; Alabama Course of Study, Grades 1-6, 1965.

ALASKA - State Department of Education, Juneau, Alaska State - Elementary Course of Study Scope and Sequence for Alaska Schools, Elementary Curriculum Handbook, 1959; Guidelines to Elementary Mathematics, Grades 1-8, 1964.

ARIZONA - State Department of Public Instruction, Phoenix, Ariz. State - Science Guide for Elementary Schools of Arizona, 1962; City - Tucson Public Schools, Tucson, Ariz. Investigations in Physical Science, 1962.

ARKANSAS - State Department of Education, Little Rock, Ark. State - High School Science Laboratory Equipment Standards, 1950; Science Experiences for Arkansas School Children, 1959; Programmed In-Service Mathematics Materials, 1964; Instructions for Organizing the In-Service Mathematics Program for Arkansas Classroom Teachers, 1964; Sets - The Number Line, 1964; Impact Teachers' Guide, 1964.

CALIFORNIA - State Department of Education, Sacramento, Calif. State - Science Curriculum Development in the Secondary Schools (Advance Copy), 1964; Reports on Regional

Conferences on Improving Science Instruction in Elementary Schools, sponsored by the California State Department of Education under provisions of the National Defense Education Act, 1962; Looking Ahead in Science, A report of the production seminar and conference on the improvement of science education in the elementary school, October 5-10, 1959; Implementing California Mathematics Textbooks, Grade 7, 1964; Implementing California Mathematics Textbooks, Grade 8, 1965; California State High School Mathematics Project-Interim Materials: Measurement, preliminary edition, 1964; Ratio, Percent, and Decimals, preliminary edition, 1963; Whole numbers, preliminary edition, 1963; Rational Numbers, preliminary edition, 1963; Inequalities, Absolute Value and Graphing, preliminary edition, 1963; Informal Geometry, preliminary edition, 1963.

County - San Diego County Public Schools, San Diego, Calif.

From Drawing Board to Launch Pad - 28-frame filmstrip with study guide, color, sound, 33-1/3 rpm. record, playing time: 8-1/2 min.; elementary, junior high

What is Oceanography? - 11 B&W, 11"x14" study prints with captions; junior high, senior high; 1962; $2.00

The Oceanographic Tower - 16 B&W, 11"x14" study prints with captions; junior high, senior high; 1962; $2.00

Birth of a Missile - 12 B&W, 11"x14" study prints with captions; intermediate, upper, and junior high; 1963; $1.00

Missiles and Space Vehicles - 13 B&W, 11"x14" study prints with captions; elementary, junior high; 1963; $1.00

Moon Exploration: (Part 1: Instrumented) - 14 B&W, 11"x14" study prints with captions; intermediate, upper; 1962; $2.00

Moon Exploration: (Part 2: Manned) (Revision) - 20 B&W, 11"x14" study prints with captions; intermediate, upper, junior high; 1963; $2.00

1000 Foot Depth Diving Saucer - 23"x29" wall chart, intermediate, junior high

Zoo Animals - 23 B&W, 18"x22" study prints with teacher's study guide; primary, intermediate; 1962; $5.75 (plus shipping charges and 4% sales tax)

Exploration of Inner Space - 30"x48" wall chart; intermediate, upper, junior high, and senior high; 1962; $.75

The Bathyscaph Trieste - Two 36"x48" wall charts; intermediate, upper, junior high, and senior high; 1962; $1.00

The Telstar Satellite - Two 23"x29" wall charts; elementary, junior high; 1962; $1.00

Astronaut's View of the Earth - 23"x29" wall chart, intermediate, upper, and junior high; 1963; $.75

How Big are Missiles? - 23"x29" wall chart; intermediate, upper, junior high, and senior high; 1963; $.75

Lunar Garden - 23"x29" wall chart; intermediate, upper, and junior high; 1963; $.75

Project Mohole - 23"x29" wall chart; intermediate, upper, junior high, and senior high; 1963; $.75

Trip to the Moon and Return - 23"x29" wall chart; intermediate, upper, junior high, and senior high; 1963; $.75

Underground Lunar Base - 23"x29" wall chart; intermediate, upper, and junior high; 1963; $.75

Teaching Children About Space Science - 75-page illustrated guide; elementary, junior high; 1962; $1.50

The Arctic Ocean - 38-frame filmstrip with study guide, color, sound, 33-1/3 rpm. record, playing time: 11-1/2 min.

Cycle of Life in the Sea - 34-frame filmstrip with study guide, color, sound, 33-1/3 rpm. records, playing time: 23-1/4 min.

Seawater Conversion Plant - 38-frame filmstrip with study guide, color, sound, 33-1/3 rpm. record, playing time: 13-1/2 min.

Communication by Satellite - 29-frame filmstrip with study guide, color, sound, 33-1/3 rpm. record, playing time: 12-1/4 min.

Animals of South America, Part I - 38-frame filmstrip with study guide, color, sound, 33-1/3 rpm. record, playing time: 9 min.

Animals of South America, Part II - 39-frame filmstrip with study guide, color, sound, 33-1/3 rpm. record, playing time: 10-3/4 min.

Human Communication - 21-frame filmstrip with study guide, color, sound, 33-1/3 rpm. record, playing time: 6 min.; elementary, junior high, senior high; $3.00

Turn to the Ocean - 43-frame filmstrip with study guide, color, sound, 33-1/3 rpm. record, playing time: 12-1/4 min.; intermediate, upper elementary, junior high; $3.00

Oceanographic Tower - 42-frame filmstrip, color, sound, 33-1/3 rpm. record, playing time: 10 min.; with study guide, junior high, senior high; $3.00

Project Mohole - 23-frame filmstrip, color, sound, 33-1/3 rpm. record, playing time: 7 min.; with study guide, junior high, senior high; $3.00

Underwater Acoustics - 29-frame filmstrip, color, sound, 33-1/3 rpm. record, playing time: 9-3/4 min.; with study guide; junior high, senior high; $3.00

Blood Banking - Parts I and II - One 28-frame and one

23-frame filmstrip respectively, color, sound, 33-1/3 rpm. record, playing time: 10-3/4 min.; with study guide; junior high, senior high; $3.00

Computers, Numbers, and People - 31-frame filmstrip with study guide, color, sound, 33-1/3 rpm. record, playing time: 11 min.; junior high, senior high; $5.95 (complete)

Medical Aspects of Space Flight - 24-frame filmstrip with study guide; color, sound, 33-1/3 rpm. record, playing time: 9-3/4 min.; intermediate, junior high, senior high; $4.95

Solid State Physics: Teachers Guide to Solid State Physics; Applications of Solid State Devices (wall chart); Atoms Large and Small (wall chart); Atoms to Molecules (wall chart); From Tubes to Transistors (wall chart); Inside the Atom (wall chart); Paper Transparency Masters.

Santa Clara County Public Schools, Santa Clara, Calif.:

Anecdotal Accounts of Teaching Experiences in Science, Primary, Intermediate, Upper grades; Science Teaching Guide, K-8, 1964; Science Curriculum for Santa Clara County, 1963.

Contra Costa County Schools, Pleasant Hill, Calif.:

Elementary Science, Suggested Materials for Fifth Grade, 1952; Fourth Grade Elementary Science Supplement, 1955.

Sacramento County Schools, Sacramento, Calif.:

Natural History Guide to the Sacramento Region, 1963.

City - Eureka City Schools, Eureka, Calif.:

Science--Course of Study, Grades 7-12, 1965; Mathematics--Course of Study, Grades 7-12, 1965; Los Angeles City Schools, Los Angeles, Calif.: Science 1 (B8), Resource Units, 1963; Science 2 (A8), Resource Units, 1963; Junior High School General Science Course of Study, 1963; Biology 1, Outline Course of Study, Senior High Schools, 1963; Biology 1, Resource Unit, Unit One: Foundations of Life, 1963; Biology 1, Resource Unit, Unit Two: Variety of Life, 1963; Biology 1, Resource Unit, Unit Three: Distribution of Life, 1963; Biology 1, Resource Unit, Unit Four: Change and Continuity of Change, 1963; Physiology Teachers Handbook, 1964; Biology 2, Outline Course of Study, 1963; Physiology, Outline Course of Study, 1964; San Francisco Unified School District, San Francisco, Calif.: Department of Elementary Schools: Science Teaching Guide, Kindergarten Through Second Grade, Revised Edition, 1956; Science Teaching Guide, Third and Fourth Grades, 1949; Science Teaching Guide, Fifth and Sixth Grades, 1949; Supplement to Science Teaching Guide, Fifth and Sixth Grades, 1949.

COLORADO - County - Jefferson County Schools; Lakewood, Colo.: Living Things, Human Body, Universe, Matter & Energy, and Earth, Elementary, K-6; Living Things, Human Body, Universe, Matter & Energy, and Earth, Grade seven, 1961-1962; Living Things, Human Body, Universe, Matter & Energy, and Earth, Grade eight, 1961-1962; Living Things, Human Body, Universe, Matter & Energy, and Earth, Grade nine, 1961-1962.

CONNECTICUT - State Department of Education, Hartford, Conn. State - Science Education, Grades 7-12, 1958; City - West Hartford Public Schools, West Hartford, Conn.: Earth Science, Grades K-6, 1961; Energy, Grades 1-6, 1962; Living Things, Grades K-6, 1964; Wilton Public Schools, Wilton, Conn.: Science Guide, K-6, 1962; Windsor Board of Education, Windsor, Conn.: Mathematics, Windsor Schools, 1964; Science Department Curriculum Guide, 1964.

DELAWARE - State Department of Public Instruction, Dover, Del. State - Status of Science Teaching in Public Schools of Delaware, 1961; Guidelines for Mathematics in the Elementary School, tentative edition, 1965; Guidelines for Mathematics in the Elementary School, Intermediate Level, tentative edition, 1965.

DISTRICT OF COLUMBIA - Public School System of the District of Columbia, Washington, D. C.: Biology Curriculum, Secondary Schools, 1964; What on Earth? Elements and the Universe; Greater Washington Educational Television: Telecompanion for Time for Science, Living Things and Forces Around Us; Time for Science - The Earth; Time for Science - Man's Use of His Environment; Teachers Manual, Time for Science, 1960-1961; Time for Science, The Earth, Teachers Manual, 1960-1961; WETA-TV Teachers Manual, Elementary level, Grades 4, 5, and 6, 1962-1963.

FLORIDA - State Department of Education, Talahassee, Fla. State - A Guide, Science in Florida Secondary Schools, Revised, 1960; Science for Children in Florida's Elementary Schools, Revised, 1958; Science for Children in Florida's Elementary Schools, 1963; Junior High School Science Program, 1962; County - Broward County Public Schools, Fort Lauderdale, Fla.: Nova Junior High Science Sequence, 1964 - Organization I, Nova Science Unit 2; Organization II, Nova Science Unit 3; Date County Public Schools, Miami, Fla.: Science Concepts for Grades 7, 8, 9, 1960; Hillsborough County Public Schools, Hillsborough, Fla.: Science Program, Junior High School, 1962.

GEORGIA - State Department of Education, Atlanta, Ga. State - Science for Georgia Schools, Volume 1, Primary, Revised, 1960; Science for Georgia Schools, Volume 2, Intermediate, Revised, 1960; Science for Georgia Schools, Volume

3, Physical Science and Biology, 1960.

HAWAII - Department of Science Education; Honolulu, Hawaii: Science Guide for the Elementary Schools of Hawaii, 1959.

IDAHO - State Department of Education, Boise, Idaho. State - Elementary Science, Idaho Study Guide, Grades 1-8; Idaho Course of Study Outline for Elementary Education, Grades 1-6, 1961; Science Program for Idaho Public Schools, 1965; Mathematics Program for Idaho Public Schools, 1965; Project Idaho - Final Report to the National Council of Teachers of Mathematics, 1965; Recommended Mathematics Materials.

ILLINOIS - State Department of Education, Springfield, Ill. State - Strengthening Science Teaching in Elementary Schools, 1960; Science Handbook Supplement, K-3; Handbook for Elementary Science Workshops; City - City of Chicago Public Schools, Chicago, Ill.: Supplement to Teaching Guide for Science, General Science, Secondary School, 1961; Supplement to Teaching Guide for Science, Kindergarten, Grades 1-2-3, 1959; Supplement to Teaching Guide for Science, Grades 4-5-6, 1959; Supplement to Teaching Guide for Science, Grades 7-8, 1959; Teaching Guide for Science, Preschool through Junior College, 1955.

INDIANA - State Department of Education, Indianapolis 4, Ind. State - Mathematics for Secondary Schools, 1963; Expanding Experiences in the Elementary School, 1960; A Good Start in School, 1958; Science for Secondary Schools, 1963; Physical Science for Secondary Schools, 1963; Earth Science Curriculum Guide for Junior and Senior High Schools, 1963; Aerospace Science Education, 1963; The Hoosier Schoolmaster of the Sixties, 1963; City - Mishawaka City Schools, Mishawaka, Ind.: Elementary Science, Course of Study for Grades Four to Six, 1957.

IOWA - State Department of Education, Des Moines, Iowa. State - Barbara and Howard Discover Atomic Energy, Reprint from Volume II of the Iowa Plan for Atomic Energy Education, 1950; The Atom and You, a Unit for Secondary Schools, 1950; Chemistry and Physics for Secondary Schools, 1950; General Science and Biology for Secondary Schools, 1950; The Iowa Plan for Atomic Energy Education, Volume I, July, 1950; Preparing Elementary Pupils for the Era of Atomic Energy, Volume II of the Iowa Plan for the Study of Atomic Energy, 1950; Iowa Citizens Investigate the Atom, Volume V of the Iowa Plan for Atomic Energy Education, 1952; Advanced General Math, 1964; Advanced General Math Answer Book, 1964;

The Status of Science in the Public Schools of Iowa, Part 1 - Elementary School, 1964; The Status of Science in the Public Schools of Iowa, Part 2 - Junior High School, 1965; City - Ames Community Schools, Ames, Iowa: Science, A Resource Study Course, K-12, 1962.

KANSAS - State Department of Public Instruction, Topeka, Kan. State - A Curriculum Guide for the Elementary Schools of Kansas, Revised, 1958; A Curriculum Guide for the Secondary Schools of Kansas, 1960; Laboratory Science Guide for Kansas Secondary Schools, 1954; Making Elementary Science Meaningful, A Guide for Elementary Teachers, Revised, 1953; One Approach to Modernizing the Mathematics Curriculum in the Elementary School, 1966; County - Shawnee Mission High School District, Shawnee, Kan.: Technical Physics, 1964; Outline Course of Study for Ninth Grade Science, 1964; Outline Course of Study in Earth Science (8th Grade), 1963; Outline Course of Study for the Beginning Course in Biology, Book A, 1962; Outline Course of Study for the Beginning Course in Biology, Book B, 1962; Biology Supplement, 1962; What is Science?, 7th Grade, 1963; Outline of Study for the Beginning Course in Chemistry, 1962.

KENTUCKY - State Department of Education, Frankfort, Ky. State - Science Education, 1961; Science Instruction, 1957; County - Jefferson County Educational Center, Louisville, Ky.: Seventh and Eighth Grade Science Advance Program, 1963-1964.

LOUISIANA - State Department of Education, Baton Rouge, La. State - What Happens to Why?, Science Education Series, 1958; Some Signposts of a Good Science Program, Science Education Series, 1958; First Annual Louisiana Science Seminar Series; Science Hints, 1965; Conservation Hints, 1965; Pine Forest Insects; Conservation - Poems, Songs and Jingles, 1964; Facilities for Teaching Science, 1960; Visiting Scientist Program.

MAINE - State Department of Education, Augusta, Maine. State - A Guide to Learning in Grades Seven, Eight, and Nine, 1962.

MARYLAND - State Department of Education, Baltimore, Md. State - Policies and Programs: Public Secondary Education in Maryland, Maryland School Bulletin, 1963; Design for Planning the Program of the Elementary School, 1965; County - Anne Arundel County Board of Education, Annapolis, Md.: A Curriculum Guide for Science, Grade Eight, 1957; A Curriculum Guide for Science, Grade Nine, 1958; Baltimore County School Board of Education, Towson, Md.: The International Geophysical Year, A Resource Bulletin for High

School Science and Mathematics Teachers; A Guide to the Social Living Program in the Elementary Schools, 1958; A Curriculum Guide, Grade Seven Science, 1958; A Curriculum Guide, Grade Eight Science, 1958; A Curriculum Guide, Grade Nine Science, 1958; A Preliminary Outline for Biology, 1959; Senior High School Curriculum Guide: Chemistry, 1961; Senior High School Curriculum Guide: General Physical Science, 1963; Senior High School Teacher's Handbook, 1962; A Guide: General Science, Grades Seven and Eight, Superior and Gifted Students, 1959; A Guide for Intermediate Grade Teachers of Superior and Gifted Students, 1959; Unit V: Breakthroughs to Space, General Physical Science; Calvert County Board of Education, Prince Frederick, Md.: Learning for Better Living, Science, Vol. I, Grades 1-5, 1964; Learning for Better Living, Science, Vol. II, Grades 6-8, 1964; Vol. III, Science Bulletin, bibliography, 1964; Learning for Better Living - A Guide for Mathematics, Levels 7-12, 1964; Learning for Better Living - Mathematics, Levels 1-6, 1963; Frederick County Public Schools, Frederick, Md.: A Guide to the Elementary School Science Program, 1963; A Guide to the Elementary School Science Program, 1964; Prince Georges County Board of Education, Upper Marlboro, Md.: The Curriculum in the Prince George's County Public Schools ... A Graphic Presentation, 1960; City - Baltimore Public Schools, Baltimore 18, Md.: General Science, Eighth Grade Program, Chemistry and Physics of Air and Water, Energy and Machines, 1960; Science in the Elementary Program, 1963; A Teacher's Guide for a Unit in Geology, Secondary School Science, 1966.

MASSACHUSETTS -

MICHIGAN - State Department of Public Instruction, Lansing 2, Mich. State - Nuclear Science in the Classroom, A Handbook for Teachers, 1957; Frontiers in Mathematics Education, 1961; Guidelines for the K-12 Science Program, 1961; Open-ended Laboratory-Centered Science for Grades 7-8-9, 1965; City - Ann Arbor Public Schools, Ann Arbor, Mich.: Integrating Conservation Education Into the Existing Curriculum of the Ann Arbor Public School System (K-12), 1964.

MINNESOTA - State Department of Education, St. Paul, Minn. State - Minnesota National Laboratory News Bulletin, 1963; A Guide for Instruction in Science, Secondary School, Grades 7-12, 1959; A Guide for Instruction in Science and Conservation, Elementary School, Grades 1-8, 1951; News Bulletin, Winter Issue, 1964-1965; City - Duluth Public Schools, Duluth, Minn.: Science Outline, Junior High School, September, 1954; Curriculum Guide for Elementary Grades, 1955; Minneapolis Public Schools, Special School District No. 1: *An Overview for the Reorganized Science Curriculum*, Kindergarten-Grade 12, 1961; *A Handbook for the Reorganized Science Curriculum*, Kindergarten-Grade 12, 1961; *The Kindergarten Supplement to the Reorganized Science Curriculum*, Kindergarten-Grade 12, 1962; *The Grade One Supplement to the Reorganized Science Curriculum*, Kindergarten-Grade 12, 1962; *The Grade Two Supplement to the Reorganized Science Curriculum*, Kindergarten-Grade 12, 1962; *The Grade Three Supplement to the Reorganized Science Curriculum*, Kindergarten-Grade 12, 1962.

MISSISSIPPI - State Department of Education, Jackson 106, Miss. *State* - Junior High School Courses of Study: *General Science*, 7th Grade; *Earth, Space and Life Sciences*, 8th Grade; *Introduction to Physical Science*, 9th Grade; *City* - Meridian Public Schools, Meridian, Miss.: *Course of Study*, Grades 1-6; *Course of Study*, Grades 7-9.

MISSOURI - State Department of Education, Jefferson City, Mo. *State* - *A Guide for Health Education*, Grades 9-12, 1961; *The Allied Arts*, a high school humanities guide for Missouri, 1963; *A Guide for Science - Agriculture*, Grades 7-8-9, 1957; *A Guide for Elementary Education*, Grades 1-6, 1955; *A Guide for Math, Grades 10-11-12*, 1958 (tentative); *A Beginning in Aerospace Education*, Grades 1-12, 1962 (tentative); *A Guide for Science*, Grades 10-11-12, 1958 (tentative); *A Guide for Mathematics*, Grades 7-8-9, 1957 (tentative); *County* - St. Louis County Public Schools, Jefferson City, Mo.: *Advanced Laboratory Techniques and Individual Research*, a course for academically talented, science oriented students; *City* - Clayton Public Schools, Clayton, Mo.: *Science Guide, K-12*, 1961.

MONTANA - State Department of Education, Helena, Mont. *State* - *The Study Guide in Science*, Grades 7-9, 1961; *The Study Guide in Science, Grades 10-12, Biology, Chemistry, Physics*, 1961; *A Study Guide in Science, Grades 1-6*, 1963.

NEBRASKA - State Department of Education, Lincoln, Neb. *State* - *The General Science Handbook*, 1956; *Science for Nebraska Elementary School Children, Course of Study and Instructional Guide*, 1957; *Science for Nebraska Elementary School Children, Course of Study and Instructional Guide*, 1960.

NEVADA -

NEW HAMPSHIRE - State Department of Education, Concord, N. H. *State* - *Biology*, 1959; *Elementary Science Guide ... Grades 1-6*, 1961; *The Wise Use of Natural Resources in New*

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